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TRANSACTIONS
OF THE
KANSAS
STATE HORTICULTURAL SOCIETY,
(ORGANIZED IN 1869.)

CONTAINING THE
PROCEEDINGS OF THE THIRTY-FOURTH ANNUAL MEETING,
TOPEKA, DECEMBER, 1900.

VOL. XXV.

EDITED BY THE SECRETARY, WILLIAM H. BARNES.

PUBLISHED BY THE STATE.



TOPEKA:
W. Y. MORGAN, STATE PRINTER.
1901.

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 J. W. ROBISON, *Vice-president*.....El Dorado.
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Third "F. L. KENOYER, Independence.	Seventh "GEO. W. BAILEY, Wellington.
Fourth "GEO. M. MUNGER, Eureka.	

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LIST OF LIFE MEMBERS RESIDING IN KANSAS.

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 Lux, Phillip, Topeka, Shawnee county.
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 Munger, G. M., Eureka, Greenwood county.
 Newberry, H. J., Galena, Cherokee county.
 Oberndorf, A., jr., Centralia, Nemaha county.
 Pancoast, B. F., Iola, Allen county.
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 Randolph, J. V., Emporia, Lyon county.
 Rhodes, Henry, Gardner, Johnson county.

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 Smith, B. F., Lawrence, Douglas county.
 Smith, W. W., Le Roy, Coffey county.
 Smyth, B. B., Topeka, Shawnee county.
 Stayman, Dr. J., Leavenworth, Leav. county.
 Taylor, Edwin, Edwardsville, Wyandotte co.
 Taylor, T. T., Hutchinson, Reno county.
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 Wellhouse, Walter, Topeka, Shawnee county.
 Wheeler, E. D., Wa Keeney, Trego county.
 Whetstone, J. H., Pomona, Franklin county.
 Whiteker, Geo. P., Topeka, Shawnee county.
 Williams, J. L., Kansas City, Wyandotte co.
 Williams, J. W., Holton, Jackson county.
 Wolverton, E. K., Barnes, Washington co.
 Yaggy, L. W., Hutchinson, Reno county.

Secretary of Manhattan Horticultural Society.

Secretary of Johnson County Horticultural Society.

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 Brackett, G. C., Fresno, Cal.
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 Dobbs, J. B., Lima, Ohio.
 Fosnot, W. E., Keosauqua, Iowa.
 Gale, Prof. E., Mongona, Fla.
 Godfrey, A. N., Dayton, Wash.
 Hall, M., Oklahoma.

Hicks, John S., Roslyn, N. Y.
 Irvin, W. A., El Paso, Tex.
 Milliken, Robert, Nampa, Idaho.
 Snyder, Wm., Ben Lomond, Cal.
 Taylor, E. A., Arcadia, Tex.
 Van Deman, H. E., Parksley, Va.
 Weidman, J., Oklahoma.

ANNUAL MEMBERS FOR 1901.

Barnes, W. B., Vinland, Douglas county.
 Bradley, R., Abilene, Dickinson county.
 Bursen, D. C., Topeka, Shawnee county.
 Chandler, A., Argentine, Wyandotte county.
 Chandler, C. A., Argentine, Wyandotte county.
 De Garmo, R., Oswego, Labette county.
 Eames, W. B., Delphos, Ottawa county.
 Ettridge, Geo., Roberts, Barton county.
 Fleharty, Wm., La Cygne, Linn county.
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 Goodell, H. E., Tecumseh, Shawnee county.
 Graves, J. M., Effingham, Atchison county.

Griess, A. H., Lawrence, Douglas county.
 Hazlett, Robert H., El Dorado, Butler county.
 Larsen, Olof, Lyndon, Osage county.
 Lloyd, T. W., Atchison, Atchison county.
 Maffet, Geo. W., Lawrence, Douglas county.
 Rosenberger, E. L., Hiawatha, Brown county.
 Rubart, Miss Lizzie, Junction City, Geary co.
 Snyder, Edwin, Oskaloosa, Jefferson county.
 Soderstrom, John E., Gove City, Gove county.
 Van Orsdol, B. F., Silver Lake, Shawnee county.
 Whitaker, E. J., Topeka, Shawnee county.
 Wilmeroth, C. W., Chicago, Ill.

Persons of good repute are invited to join the Society. Life memberships cost \$5, and entitle the holder to all privileges during life. Annual memberships cost \$1, and cease at the next annual meeting. Annual members receive the literature of the current year. Electors must be either life members, duly accredited delegates from local societies, or annual members of *one full year's* standing. Annual meetings are open to the world, and premiums are given on all worthy exhibits.

LETTER OF TRANSMITTAL.

OFFICE OF KANSAS STATE HORTICULTURAL SOCIETY,
STATE CAPITOL, TOPEKA, KAN., June 15, 1901.

To his Excellency W. E. Stanley, Governor :

We here present to you our first report on horticulture for the twentieth century, and hope you will examine it thoroughly. As the nineteenth century saw the birth of nearly all great improvements in horticulture, many of the now absolute necessities, like the tomato, being unknown as edible at its beginning, while others, like the strawberry, were cultivated but scatteringly, were of tiny size, and scarcely grown as a commercial product a hundred years ago, has become a double mouthful of most entrancing flavor. So of the peach, plum, cherry, and various small fruits; patient, industrious horticulturists have steadily improved them all. We can only hope that, through legislative encouragement, our citizens of coming generations may become so enlightened on this most important industry that *Ad Astra per Aspera* may be as true in horticulture as in other lines of Kansas industry. Three premiums, aggregated into a "Diploma of Gold Medal," supplemented with five other diplomas to individuals, are the trophies of the year (1900) taken at Paris. We only regret that the horticulture of our state is unrepresented at the Pan-American Exposition.

We respectfully submit this twenty-fifth report, of the thirty-fifth year of the Society's work, and hope for your approval.

FRED. WELLHOUSE, *President.*

WILLIAM H. BARNES, *Secretary.*

DELEGATES TO THIRTY-FOURTH ANNUAL MEETING.

Names marked (*) were alternates.

Allen county:

B. F. Pancoast, Iola.
 E. H. Funston, Carlyle.
 *J. F. Tredway, La Harpe.
 *J. B. Furgus, Lone Elm.

Douglas county:

Geo. W. Maffet, Lawrence.
 M. Planchett, ———.
 *D. G. Watt, ———.
 *N. P. Deming, Lawrence.

Franklin county:

A. Willis, Ottawa.
 Mary E. Lester, Ottawa.

Jefferson county:

Edwin Snyder, Oskaloosa.
 Elias Grey, Perry.

Labette county:

R. De Garmo, Oswego.
 Chas. Harrington, Altamont.

Leavenworth county:

Geo. C. Richardson, Leavenworth.
 Miss E. Geyer, Leavenworth.
 *F. Eason, Lansing.
 *Dr. J. Stayman, Leavenworth.

Montgomery county:

R. Y. Kennedy, Coffeyville.
 Jacob Good, Coffeyville.

Osage county:

N. Arnold, Burlingame.
 C. D. Martindale, Scranton.
 *J. E. Bush, Burlingame.
 *J. K. Rogers, Burlingame.

Riley county:

J. B. Haney, Manhattan.
 William Baxter, Manhattan.
 *Mrs. Albert Dickens, Manhattan.
 *F. H. Marlatt, Manhattan.

Saline county:

Thomas Anderson, Salina.
 Prof. A. W. Jones, Salina.
 *F. G. Baker, Salina.
 *James A. Reser, Salina.

Shawnee county:

D. C. Bursen, Topeka.
 A. E. Dickinson, Meriden.

Wabavunsee county:

C. C. Cook, Bradford.
 John McMasters, Eskridge.
 *John Cousins, Eskridge.
 *Wm. H. Rhinehart, Eskridge.

PROCEEDINGS

OF THE THIRTY-FOURTH ANNUAL MEETING OF THE KANSAS
STATE HORTICULTURAL SOCIETY, HELD IN
TOPEKA, DECEMBER 27-29, 1900.

FIRST DAY—Morning Session.

DECEMBER 27, 1900.

Meeting called to order by President Wellhouse.

Opening prayer by Rev. F. W. Emerson.

Doctor Bohrer gave a short opening address.

The president appointed the following committees:

Credentials: E. J. Holman, G. W. Bailey, F. W. Dixon.

Program: F. L. Kenoyer, J. Fulcomer, A. E. Dickinson.

Membership: J. L. Williams, Dr. G. Bohrer, H. L. Ferris.

Auditing: B. F. Van Orsdel, E. D. Wheeler, J. C. Beckley.

Obituary and Final Resolutions: D. C. Bursen, C. A. Chandler, A. S. Hitchcock.

Exhibits: William Cutter, B. F. Pancoast.

SEC. WILLIAM H. BARNES: The gavel now used by this Society, and given to it years ago, was made from a pear tree grown by Marshal P. Wilder, at Boston, Mass., many years ago; but it is of eastern growth. Many of us came from the East, but we are now Kansans by adoption. It gives me great pleasure to present you this morning a Kansas gavel, made from a catalpa tree grown in our state, and presented to this Society by G. W. Tincher.

MAJOR HOLSINGER: I would call the attention of the members to a matter that had its inception in the Missouri state horticultural meeting two weeks ago, in which a committee was appointed to formulate a plan by which the horticulturists of the middle West should go in a body to the coming thirtieth annual meeting of the American Pomological Society. Mr. Irvine, the editor of the *Western Fruit Grower*, has been in correspondence with the fruit-growers of New York, and this Missouri committee was appointed for the purpose of naming a time and formulating a plan by which the horticulturists would attend the Pan-American Exposition in a body. Mr. Irvine is the head of that committee. The same matter was taken up at the Iowa state meeting, at which Mr. Gano and myself were present. It was then suggested that Kansas and Nebraska charter a train of Pullman cars and go up through the great fruit districts of Michigan and Wisconsin to Buffalo.

Major Holsinger moved that a committee of three be appointed to confer with the state horticultural society of Missouri, and possibly Nebraska, looking to an excursion of horticulturists to take in the Pan-American Exposition at some time during the autumn, which was carried.

President Wellhouse appointed as members of that committee Maj. Frank Holsinger, Col. J. W. Robison, and Senator Edwin Taylor.

REPORTS OF TRUSTEES.

Report of E. J. Holman, first district: The first district of the state, I suppose, comprises *the* apple-growing district of the state. Brown, Leavenworth and Doniphan counties, so far as I can learn, are the most prosperous as to apple orchards in the state. There has been nothing to retard orcharding. Planting was quite extensive this year, and our growers very hopeful. Old orchards in that portion of the state were irreparably injured by the cold winters of 1898 and 1899, and must be superseded by young orchards; yet, to my mind, the outlook for orcharding is better than ever. We must plant new trees to take the place of those that were killed. Everything that was standing in the orchard then was more or less injured.

I would compare the effect of the cold on the trees to consumption. If it takes hold of young trees they are more likely to outgrow it. Those that were set out since that cold winter and taken care of are expected to make good and fruitful trees. In our section more attention is now given to peach growing than for many years. It is profitable. There is also considerable interest in pear growing. The Keifer pear craze, I think, is carried to excess. Cherries were almost exterminated by the cold winter referred to and, to-day, are almost extinct or in process of extinction. There is a tremendous demand for young trees. There is a profit in cherry growing that seems never to have been before realized. There is an unabated and increasing interest in means of exterminating the San José scale and other pernicious things which threaten the orchardist. There is a growing sentiment toward giving more attention to horticulture. In my own county (Leavenworth) we have been easy and have not progressed much with our horticultural association. Some old fellows stick to it and are working to get in young blood. The young men are coming into the work throughout the district. Our only hope is to encourage the young people to push horticultural work.

As to the outlook, there is not much to expect from the orchards twelve, fifteen or twenty years old in the first district. I do not believe they will ever give us much, yet I could name instances where old orchards have revived and yielded profitable crops. I am glad to say that in the first district the interest in horticulture is alive, and the future in our part of the state will in no small manner be devoted to horticulture.

F. W. DIXON: What varieties of cherries are being planted?

E. J. HOLMAN: The Early Richmond and Morello.

F. W. DIXON: I do not see that the interest in the cherry has abated. Apple orchards do not seem to be much injured. I have much faith in the future prospects.

REPORT OF B. F. SMITH, TRUSTEE OF SECOND DISTRICT.

Number of trees not in bearing: Apple, 57,141; pear, 4250; peach, 27,892. Acres of raspberries, 70; blackberries, 125; strawberries, 57. Reported by assessors of 1900 for Johnson county.

Wyandotte County.—Apple trees not bearing, 91,010; pear, 11,778; peach, 62,403. Raspberries, 1344 acres; blackberries, 370; strawberries, 214.

Anderson County.—Apple trees not bearing, 31,702; pear, 1310; peach, 6174. Strawberries, 20 acres; blackberries, 63; raspberries, 18.

Franklin County.—Apple trees not bearing, 27,841; pear, 1296; peach, 9009. Raspberries, 15 acres; blackberries, 27; strawberries, 22.

Miami County.—Apple trees not bearing, 50,884; pear, 3456; peach, 16,056. Strawberries, 18 acres; raspberries, 12; blackberries, 45.

Allen County.—Apple trees not bearing, 27,495; pear trees, 980; peach trees, 7992. Raspberries, 13 acres; blackberries, 48; strawberries, 6.

Douglas County.—Bearing apple trees, 142,552; not bearing, 63,877. Bearing pear trees, 11,764; not bearing, 6877. Bearing peach trees, 49,789; not bearing, 23,102. Cherry trees not bearing, 3234; plum trees not bearing, 2077. Blackberries, 164 acres; raspberries, 122; strawberries, 156; vineyards, 157; gallons wine made, 1339. Value of horticultural products, \$12,731.

Is any progress being made in horticulture? Yes. It is the writer's opinion that the planting of all sorts of fruits are keeping pace with the demand, when prices and profits above cost to grow are considered. Peach- and pear-tree planting is on the increase. In the second district many old apple trees are failing, yet many new ones are being planted.

There is in each county a horticultural society. The attendance is fair to good. Summer meetings are usually well attended, when held at the home of a member of the society. As to increasing the interest in horticulture, would say that good crops of fruit and good prices are the mainsprings. When one has a good and profitable crop of fruit, he is more regular in his attendance at horticultural meetings. The program and discussion should be frequently changed. With a good secretary and standing committees, with prompt reports, and some help from the ladies, the monthly meetings will always be interesting. This has kept the Douglas county society alive for over thirty-three years.

TRUSTEE'S REPORT, THIRD DISTRICT.

F. L. KENOYER, Independence.

The third district, which I represent in this Society, includes the counties of Cowley, Elk, Chautauqua, Wilson, Montgomery, Neosho, Labette, Crawford, and Cherokee. These seven counties comprise the two southern tiers from Winfield, Cowley county, to the Missouri line. In this section horticulture has been greatly neglected, although the last year I think has witnessed an increasing interest in the growing of fruits. More of the large fruits are grown in the eastern than in the western counties of this district, as the climatic conditions are more favorable for tree growth. Some varieties of all small fruits, excepting currants and gooseberries, do well throughout the district.

There are but few commercial apple orchards, and most of these do not pay expenses. The long, hot summers, combined with poor cultivation or no cultivation at all, causes the fruit to ripen prematurely. Such varieties as Ben Davis, Missouri Pippin and Winesap are fall apples and seldom keep till Christmas. The Little Red Romanite and Rawle's Janet are the only sorts that keep until mid-winter. What effect cultivation would have on a bearing orchard I do not know, for I have never seen one that was properly cultivated. Last fall I took a trip through Labette and Cherokee counties, where perhaps the greatest number of the commercial orchards are located, and I did not see a single orchard that had been kept free from weeds, and but few that had been cultivated at all. Surely the keeping quality of our apples would be improved were the soil moisture retained by thorough cultivation. What we need is a variety of apples larger than Rawle's Janet and possessing the same productive and keeping qualities. The Ingram may fill the bill when fully tested.

Peaches are grown in considerable quantity for home consumption. They have not proven satisfactory as a commercial fruit.

Pears, also, are grown only for local trade and home use.

Cherries are not very extensively grown. The Early Richmond and Montmorency seldom fail to produce full crops, and would no doubt be profitable if produced on a large scale.

Plums do well, but are a poor market fruit.

Grapes are grown in sufficient quantities to supply the home market during their ripening season, and they are fairly profitable. The early varieties bring the best returns. Late sorts are usually more or less affected by the drought.

The berry fruits do much better than any other, and are more extensively grown, both for home and shipping markets. I shall speak of these fruits more fully in my report on "Small Fruits."

The average prices realized for the various kinds of fruits the past season were about as follows: Apples, 50 cents; peaches, 75 cents; pears, \$1, and plums, 50 cents per bushel; cherries, 25 cents per gallon; grapes, 2½ cents per pound. Blackberries, \$1.20; dewberries, \$1.50; raspberries, \$3, and strawberries, \$1.50 per crate.

In my district may be found the skeletons of four horticultural societies—one in Cowley, one in Elk, and two in Montgomery. A short time ago I wrote to the secretaries of these societies, inquiring as to their condition. From the information I gathered, three of these societies might fittingly be described by an inscription I once read on a tombstone in the Hoosier state: "Weep not for me, my comrades dear; I am not dead, but sleeping here." As I could get no word from the others, I will describe their condition by another familiar epitaph, "Dead, but not forgotten."

What should be done, or *could* be done, to infuse new life into these dormant societies is a puzzling question. Certainly our state secretary has made a commendable effort in this direction, but so long as the erroneous impression prevails that fruits cannot be made to yield a profit, the societies will continue to sleep. Too many of those who have discovered that there is money in fruit-growing wish to keep their valuable discovery to themselves, lest others might compete with them and share their profits.

Farmers' institutes are held in nearly all of these counties, which usually discuss a few horticultural topics. Farmers are becoming more interested in growing fruits for family use and are setting many kinds of fruit-trees and berry plants. I think we are making some advancement and the outlook is brightening for the future of southeast Kansas.

Our greatest need is a good large winter apple that will hang on the tree until October and then if properly handled will keep till March. The time is not far distant when such an apple will be produced. A decade ago we were without a single variety of raspberry that could be successfully grown, and only one variety of blackberry, the Kittatinny, and its crop was occasionally cut short by a July drought. Since the introduction of the Kansas raspberry we are enabled to compete with our northern neighbors in the production of that luscious berry. The Early Harvest blackberry gives us a crop every year despite the drought and heat. And now the noble Early Harvest is destined to be superseded by a berry that is its equal in all things and its superior in earliness, size, and quality of fruit.

What has been accomplished in the small fruits may be and ultimately will be accomplished in the apple. I expect to see the day, yes, more than this, I intend to help to usher in the day, when southeast Kansas shall not be a whit behind northeast Kansas in the production of both tree and berry fruits.

R. DE GARMO [supplemental to report of F. L. Kenoyer, third district]: The district is very large, and the report very partial. The third district was the first district in Kansas that raised and shipped apples to market, from the little town of Oswego, where I live. Many varieties were planted that never ought to have been. We have one of the best fruit sections of the state. A few varieties of pears do fairly well.

A MEMBER: What varieties are exempt from blight?

R. DE GARMO: The Duchess stands it pretty well, and the Seckel is not subject to blight, but will bear good crops. I am secretary of a horticultural society that is neither dead nor sleeping. There are some beautiful orchards of from 40 to 120 acres in Cherokee and Labette counties. The bitter rot is what we are laboring with now. We have a large number of young orchards coming on.

J. L. WILLIAMS: I helped settle Labette county, thirty-two years ago, and did my share of the orchard planting, and we shipped hundreds and thousands of bushels of apples and peaches from that county. I also helped organize a horticultural society in that county. [There is a fine society at Altamont.]

EDWIN SNYDER: I was very glad to hear the report from the first district, and that it was encouraging. I want to say a word about cherries. I have a cherry orchard twenty-five years old that never bore a better crop than last year, and my young orchard, from six to eight years old, was never in so healthy a condition. I expect the old orchard to die. I would not plant the English Morello; they are worthless to me. They get wormy. I consider the Montmorency the best market cherry grown. I would plant the Early Richmond to some extent.

J. W. ROBISON: I would like to ask the gentleman why he expects his orchard to die?

EDWIN SNYDER: Because it is old.

F. L. KENOYER: I never saw an English Morello that a worm would dare to attack, on account of its being so sour.

MAJOR HOLSINGER: What is the name of the blackberry to which Mr. Kenoyer makes special reference?

F. L. KENOYER: The name "Kenoyer" will be applied to it when ready for dissemination.

FOURTH DISTRICT.

J. W. ROBISON, vice-president: I live on the western edge of the fourth district, where the conditions are similar to those of the seventh. Cannot report for the eastern portion of my district, but in the western we had a fair average crop, which grew very well until about time to mature, but it utterly refused to keep. Our Ben Davis and Missouri Pippin are ripe in early September, and were gone by October 1; so we had no trouble raising fruit, but the trouble has been to keep it long enough to market. Those we sold brought fifty to sixty cents per bushel.

FIFTH DISTRICT HORTICULTURAL REPORT.

WILLIAM CUTTER, Junction City.

Our progress in horticulture has been slow, if any, for the last few years. Apple planting is not half what it was ten years ago, especially in the western counties. Stock and wheat men, as a rule, pay little attention to fruit-growing, yet there is scarcely a neighborhood that has not its successful apple grower, who buys his trees as near home as he can, gives them clean culture, and usually sprays thoroughly. The lack of thoroughness is bringing spraying into disrepute. The most thorough sprayers are always its strongest advocates. The success of these men is being watched by their neighbors, and young, well-kept orchards are greatly on the increase. Still, far too many trees are used to replant old orchards, which, although sometimes successful, is usually a graveyard for nursery stock. People are fast finding out that neglect has been their worst mistake in fruit-growing. Where mulching has been used in old orchards it has proven a complete success. The foregoing pertains more particularly to the western portion of my district. In justice to the eastern part I will say, that Marshall, Riley and Geary counties are more rolling and better timbered than the balance of my district, and the uplands appear better adapted to fruit than the

western portion. These counties were settled earlier. They had nurseries near at hand, and the tree planters appear to be a more careful people, especially in Riley county, where some of the most successful orchards in Kansas are found. Apples sold in the orchard at fifty cents per bushel. Now they are scarce at a dollar.

The success of peaches for eight to ten years has greatly increased the demand for trees, and interest in them is far in advance of all other fruits.

Neglected seedling orchards, so generally depended upon, were damaged by the winter two years ago, so that last summer's drought finished them. They have taught their owners a lesson, and they are planting budded trees, which they propose to take better care of. Peaches brought from one to two dollars last year. There was not half enough for home demand, and will not be for years to come. Cherries and plums are being planted freely; plums and apricots are not much wanted. It is hard to get farmers to attend a horticultural meeting, and exclusive fruit-growers are very scarce. If there is a successful society, except at Manhattan, we do not know of it. Horticulture is allowed small chance at farmers' institutes; dairymen and stock-growers hold the fort. Local societies would be very beneficial if we could get people to attend them. It is hard to say what variety of fruit offers the greatest inducement to planters. All our standard fruits pay well where properly cared for.

A trustee can do little toward interesting the people in horticulture. The penuriousness of our legislature in not allowing more and larger volumes of our transactions to be printed is the greatest injustice and injury alike to our Society and the fruit interest of the state that it is possible to inflict. They should be sent direct to the people. Many would fall into the hands of people who do not know there is such a thing as a State Horticultural Society.

SECRETARY BARNES: Since the present Board has been in power we have absolutely refused to give a member of the legislature more than one copy of the report, and have insisted that they belong to the horticulturists, and in no case has a member of the legislature received more than *one* copy.

W. B. EAMES: I rise for Ottawa county. I have never seen a report from that county yet. I am anxious to let the Society know we have fruit up in Ottawa county. It is in the fifth district. Some have failed because they do not know how to put out an orchard. Subsoil is the secret of success in orcharding. You should have a subsoil porous enough to let the roots penetrate deeply. Its natural condition should be one that will hold moisture, and fertile enough to produce a crop of corn. Ninety-nine times out of a hundred you have an ideal orchard soil where corn will grow. By reading the reports of this Society years ago I got pointers that were of great benefit to me, and feel to thank the Society for it. First, as to location, and then as to varieties. Years ago I got varieties recommended by this Society. I found a locality in the foothills, seven miles from my home, and just below a layer of limestone, varying from ten to twenty rods in width, which is an ideal apple soil. I have never wrapped a tree, and my trees are healthy. I lean my trees to the southwest. I have never been bothered with flat-headed borers. The rabbits have troubled me some, but I settled that question with a grayhound. I have for years been studying what to do about codling-moth and birds. The birds every year get a large share of my apples. They are up early in the morning. The brown thrush and blue jay are the worst. The sparrow does not bother. Some years ago, out of thirty-six Jonathan trees, none of which were quite full, however, the moth and birds left me only twenty-one specimens. The oriole was the worst bird on cherries. [Use bird kites.]

R. BRADLEY, of fifth district: This is my first opportunity to attend a meet-

ing of this kind. In listening to the discussions this morning in regard to the culture of different kinds of fruit, and the pests of birds and borers which we all have some knowledge of, I would say that I have devoted the last ten years of my life to selling nursery stock and planting fruit-trees, and have seen Kansas farmers trying to grow orchards on high and dry Kansas prairies in our district. In some instances the planter has become discouraged. I notice they allow the soil to accumulate around the body of the tree, where it acts as a roof and runs the moisture away from where it should be. Many of the failures I lay to that. Trees will receive a good deal of moisture that runs down the body of the tree from a little shower of rain. If you have a little hollow to catch the moisture and hold it about the body of the tree instead of warding it off, the bark on the tree will not shrivel. The flat-head borer is another cause of failure, especially of young trees. Borers are not very injurious to full-bearing trees, but flat-headed borers are very injurious to the young trees. I have tried mulching around trees until they get started. Of course cultivation is better. A horticulturist will cultivate and take care of his trees, but the average farmer plants his trees in the spring, neglects them, fails to cultivate, and as a result they shrivel and die from lack of moisture. In order to protect trees against this I advise mulching. It holds moisture, keeps the roots cool, and carries it through the summer. I have found this very successful in my experience. I do not advise mulching the ground all over. Cultivation is much better in all cases.

Wrapping the trees, as discussed this morning, is a good plan, especially for young trees. We have been introducing the wood veneering, which protects the tree from rabbits and extreme cold in winter and from sun-scald in summer. In transplanting we often get the tree turned around, and it will 'sunburn or scald. Plant sixteen feet each way, and cultivate thoroughly. Corn may be grown between, but we prefer small fruit, removing the same after fruiting time in four or five years. With good cultivation and by closely watching for borers, there is no cultivated crop that will respond quicker. During fruiting time some damage will be done by crickets and other insects that gnaw holes in the fruit. The curculio destroys the most of the crop of such early peaches as Alexander, Amsden, etc. I have never seen a case of yellows; leaf curl pays an occasional visit, but does no great damage. Rot does much damage, especially during a wet season, particularly to the white, thin-skinned varieties.

Have about despaired of ever getting a crop of plums. Have not secured a crate of good plums from 800 Wild Goose since 1895. The trees are planted on several locations, age varying from five to fifteen years; the trees never fail to bloom but most blossoms and young fruit were blasted by cold rains and frosts. However, where we met failure some of our neighbors were fairly successful. In a few instances where poultry was confined in the orchard the trees bore a fair crop. Trees outside of the enclosure, not 100 feet distant, were almost bare. Another case where swine were confined in the orchard, trees were equally full. Ripe fruit was damaged by falling on the hard ground. Prices did not pay to hand-pick the fruit. From some of the smaller varieties better results were obtained. The Pottawatomie is one of the most prolific sorts, and this is its worst drawback. On three-year-old trees fruit literally hung in ropes, causing the trees to split badly. Poole's Pride is some larger, but, like the Pottawatomie, tends to overbear.

The Japanese are not as hardy as the American sorts. However, we have not missed a season where they failed to bloom; neither do they fail to rot. This can be practically overcome by harvesting the well-matured green fruit. It is doubt-

ful if the rot can be overcome in this climate. Still I think it will pay to keep a few Burbank and Abundance. The Gold rots worse than these.

Damson will yield an occasional crop and bring good prices.

In planting we proceed about as for peaches. The enemies of all plums are curculio and gouger. There is no practical remedy. Spraying may check the rot. Prices will not justify much expense on plums.

We market in twenty-four-quart berry crates and eight-pound grape baskets.

REPORT ON FRUIT CONDITIONS.

WILLIAM CUTTER, Junction City.

Before entering upon the subject assigned me I wish to hedge against any mistakes I may make.

July and August were the hottest and driest that I remember during my residence of over thirty years in Kansas.

Fruit of all kinds wilted upon the trees, which no doubt had its effect upon the size, quality, and time of ripening. So that it is quite likely that a more favorable season will change my opinion of some varieties. I have received no apples for name excepting well-known varieties. The York Imperial is striding toward the front rank of winter apples. Fanny is elbowing its way up among the summer kinds, and Spohr is still the ideal apple in the opinion of its originator. Burbank is proving the best of the Japan plums or their seedlings.

Woodruff's Red is growing in favor among grape growers. Campbell's Early ranks high as an early grape, but did not stand the drought well. Our late seedling ripened upon the vine this year for the first time and was better than we anticipated.

Of peaches, the Sneed is full a week earlier than any other we have in bearing. It ripened before dry weather set in. Was of good size and fair quality, but so soft and the color so unattractive that it is no good for market.

Triumph is one of our most productive kinds. It ripens with Alexander; is about the same size, and, we think, a much finer peach. Greensboro is of the same season, and with us is the largest and best of the very early varieties. Well-grown specimens have a fine red cheek. Carman is one of our earliest freestones; of good size, good quality, and fine color. I think it has come to stay. Lewis I got two years ago, and find it differs from the Carman only by being rather smaller with us *this year*. Captain Eads is a grand peach for home use and near market, but I fear its season laps too far onto Elberta's to sustain the commercial value that we had hoped for. New Prolific is certainly entitled to the latter part of its name; its quality, appearance and productiveness are all that we could ask for; but it runs right against the Elberta season, and is knocked clear out as a commercial peach.

How unfortunate it is that so many of our best varieties, like Champion, Crosby, Old Mixon Free, and Captain Eads—all noted for productiveness and fine quality—ripen so nearly at the same time.

Elberta, while possessing neither of the above qualities, is successfully holding its place as the best market peach in existence. But we must have peaches after Elberta is gone, and who can tell us the best market variety to follow it? Is it Picquet's Late, Chair's Choice, or Wager? Or is it to be a new variety, like Matthew's Beauty or Emma? The latter bore for me this year. It is a seedling of Elberta, starts into bearing much earlier, and possesses more of its parent's good points than any other seedling I have seen.

The next new peach in value (to us) was the Gold Drop. Its size, productiveness and quality are all that we could ask; its color is a bright yellow, often with

a deep red cheek. Bonanza ripened up nicely this year, outbore everything except Early Rivers, sold at a fancy price, and is the best variety we have bearing to follow Heath's Cling and Salway.

A. S. HITCHCOCK: I have a ten-acre apple orchard, about ten years old, on which the effect of the winter is not noticeable. I have some Grimes's Golden which show symptoms of the bad effect of the cold. Peaches are greatly damaged. The Elberta, by severe pruning, came out all right. I cut them back to stubs, and last year I had a crop of fine peaches. Other varieties were killed.

SIXTH DISTRICT HORTICULTURAL REPORT.

E. D. WHEELER, Wakeeney.

The natural conditions in the northwest district of the state being somewhat adverse to successful horticulture, it should be understood that when I report progress in horticultural development I do not mean that it is universal or rapid. Although a large per cent. of our attempts to grow a variety of fruits may be classed as partial or total failures, we are progressing, for many have learned by experience how not to grow fruit, and others are learning how to grow it from the successful ones.

There can be found in nearly every neighborhood those who report some degree of success, and who have faith and courage to continue their efforts until they have demonstrated that fruit can be grown in the western part of the state. We have those in the more arid and undeveloped portion of the sixth district who are so thoroughly discouraged by failures in attempting to grow fruit that it is not an easy task to get them to investigate the reasons for success or failure, and it will only be when they have paid their neighbors good prices for fruit and they learn through some source that by intelligent effort they can grow their own fruit.

In the eastern counties of the district the ability to grow fruit successfully is no longer a disputed question with many. As we proceed west the number of those who have made any marked degree of success grows less. Plums, cherries and peaches are being grown with a fair degree of success throughout the district. Apples, pears and apricots require the most favorable conditions in order to insure success. Among the small fruits that are being grown are strawberries, blackberries, raspberries, and currants. Though of inferior quality, the Black currant is the more hardy and productive. It is found growing wild, but improves with cultivation, and is planted quite extensively. Apricots are often prevented by late frosts. The success of all of the fruits mentioned depends on a wise selection of varieties, the location of the orchard, careful planting, thorough surface cultivation, or a mulch; also, protection from drying winds. While it is true that the greatest injury comes from the south and west winds, yet other winds are more or less drying, and often damage trees during a dry fall or winter. A good hedge or timber belt that surrounds the orchard catches a large portion of the snow, and helps to prevent the fruit from blowing from the trees or bushes, as well as preventing rapid evaporation and transpiration.

Heading the trees near the ground and planting closer than in the eastern districts has been found to be a good practice. Short-lived trees may be planted between the rows to afford protection. The greatest trouble is to prevent them from all being short-lived, in some localities. Sometimes protection is afforded by buildings, or a high bank or bluff in the bend of a creek or draw, and often water may be found in such a location so near the surface that irrigation is unnecessary. While such locations as those just mentioned are far more desirable, yet I am acquainted with several orchards on upland where it is more than 100

feet to water that have been kept in a thriving condition by dry dirt or other good mulch, supplemented by from one to three good irrigations during the dry times which usually come just before the later fruits mature, and sometimes continue even into the winter. The snow or rain collected during the winter, spring and early summer usually renders irrigation unnecessary during the spring and early summer.

Cherries, plums, peaches, currants, strawberries, raspberries and blackberries should be planted by all who will give them proper attention. Repeated failures of apples have caused a falling off in the number of trees planted, but an increase in the number grown successfully. Horticultural societies and farmers' institutes, if properly organized and conducted, would be a great help in bringing out and disseminating important facts relating to horticulture in its various branches. Thus far, we have had few of them. I have attended several institutes in the west half of the state, and almost invariably horticulture did not receive the attention its importance demands. In every county in Kansas can be found men and women of ability who can make such meetings instructive and enjoyable. Experts who are thoroughly acquainted with conditions and results can be a great help at such meetings whenever they are held. In my judgment, local horticultural societies should be organized in every county where wide-awake horticulturists can be induced to join. As to the price that can be obtained for the fruit in local markets, will say that it is governed largely by the cost of shipping it in. Except in the eastern counties of the district, we do not, and will not for some time to come, grow fruit enough to supply the local demand.

Our fruit is of fair quality, and sells direct to the consumer, usually at from \$1.50 to \$2 per bushel for peaches and plums, and from 90 cents to \$1.20 for apples. Very few apples are grown for market except in the eastern portion of the district. In Wa Keeney (county-seat of Trego county) one merchant has just sold out a car-load of eastern Kansas apples, and is now selling out (quite rapidly) a car-load of apples from the state of Washington that are packed in bushel boxes and sell for \$1.30 per box. The varieties number twenty-four and nearly all were very choice, and free from worms, scabs, and other defects. The eastern Kansas apples came in barrels, and sold for ninety cents per bushel. Berries and cherries usually sell at from ten to fifteen cents per quart.

If this Society could secure a fruit rate to our western counties it would be appreciated by would-be consumers and eastern Kansas fruit-growers who have fruit that goes to waste. It would be on the principle of the greatest good to the greatest number. Where orchards have been planted on ground that has a porous subsoil in place of the dry hard-pan, results are much more satisfactory. The hard winter two years ago destroyed many of the peach trees, and failure to properly care for an orchard is quite common.

R. N. BAKER: In the state of Kansas there are three rain belts—the eastern, middle, and western. I have lived for twenty-seven years near the eastern edge of the western belt, and have spent considerable money in trying to get an orchard started. We organized a farmers' institute, and it did not "die off." I had quite a large orchard, and think I was the only man in the county who took the needed care of the apple orchard. Hot winds kill the trees, the sun blisters them, twig-blight gets into them, and I make a practice every year of wrapping the trees from the ground, or just under it, clear up into the limbs. I take old cloth or newspapers and wrap them and tie with a string. I find it is of much benefit as a protection from the sun, but more especially from the rabbits. If I could, I would invent a plan for killing all the rabbits and Belgian hares. The best producing apples in my orchard are the Missouri Pippin and Ben Davis. My

apple trees are in a thrifty, growing condition. I also keep my peach trees wrapped, protecting them from borers and rabbits. In cherries, I find the English Morello a success. I raised twenty bushels last year. The Montmorency is the best. I have 4000 cherry trees on my place. As to pears, they are not a success. Sometimes they blossom but set no fruit. In small fruits, the Black currant is the only one we succeed with. Raspberries, strawberries, blackberries and gooseberries are failures. One living in this section of the state should wrap his trees with paper, if he cannot get cloths, and I think he will succeed.

R. DE GAEMO: Do you loosen the wrappers on the trees during the summer?

R. N. BAKER: That is when I am most particular to have them there; keep them on all the time. Scrape the tree and get all the insects off before wrapping them.

REPORT OF SEVENTH DISTRICT.

GEO. W. BAILEY, Wellington.

Interest in horticulture is increasing; more fruit-trees of nearly all classes were planted this season than usual; apple trees led the list, more than ten to one; cherry, peach, plum, apricot and pear in order named; blackberry, strawberry, raspberry and gooseberry in the order named. No currants reported; grapes led the list of small fruits. Local horticultural societies, none reported. In my own county, Sumner, four farmers' institutes were held this fall and winter. Indirectly, the subject of horticulture came before these meetings. The quality of the different classes of fruit was reported fair to good; quantity not equal to the demand. The average selling price of apples was 75 cents per bushel; peaches, 60 cents; plums, 90 cents; pears, \$1.25; berries and cherries, \$1 per crate; grapes, 3 cents per pound.

"What plan can you suggest to increase the interest in horticulture in your district?"

In reply to this question, I wish to say that, under past appropriations of the legislature for this Society, our secretary has been permitted to publish a few hundred reports—a little, not much, larger than a school primer. These little books are sent out one to each 600 inhabitants, and give this one person in 600 all the available information of one of the leading industries of the richest, most prosperous state in the union, with a million and a half of live, energetic, intelligent citizens, that are not only able but willing to pay for the publication of five times the number now published, and not the size of a primer, but a fair-sized book from 200 to 300 pages, filled with choice, up-to-date horticultural information that would be a credit to our fair state and a just recognition by our legislature of our horticultural interests. If this could be accomplished, and I believe it possible, it would help our standing as a Society at home and with our sister states.

An effort, properly directed, need not be very expensive. Let the secretary formulate petitions asking for an appropriation for the publication of 10,000 or 12,000 copies of our reports, limited to 200 or 300 pages. Send these petitions to live, hustling horticulturists throughout the state, and after the names are secured send the petitions to the members from the legislative district in which the names were secured.

I believe, if an effort of this kind is made, it will at least result in a more favorable consideration from our legislature than we have been able to secure in the past. We may be able to influence our legislature to allow the publication of 5000 copies twice the size of a "primer." This would give one copy to every 300 inhabitants.

E. D. WHEELER: I wish to commend the gentleman's suggestion as to wrap-

ping trees. I am glad he brought it out, that it may get into our report. Some seasons I have failed with strawberries. Last spring I planted, losing not more than one plant in twenty. I had more trouble in keeping them from fruiting than anything else. I do not want the people of the sixth district to think that they cannot raise small fruits.

J. J. ALEXANDER: I live farther west than any of you. We raise gooseberries in abundance. With us the currant is a failure. Strawberries are the easiest thing we have raised.

E. D. WHEELER: One kind of blackberry can be raised in that section. Two years ago, in Meade county, I found a man who was growing blackberries successfully. I never saw better. He said he had tried but failed, until he grew that particular variety.

GEO. W. BAILEY: In the uplands we have good orchards. Unless we sub-soil, I do not think we can make anything like a complete success without irrigation or subsoiling, or something similar [mulching?]. Fruit grown in our lowlands is as good as any I ever saw displayed at the state fair. I know an orchard on the Arkansas river that grows as fine Winesaps and Missouri Pippins as I ever saw, and they keep better than the stunted fruit grown on our upland.

JOHN FULCOMER: My neighbor told me that he got his best crop this year. His orchard is on overflowed land, which is soft. We have no winter-killing. A few of the peach trees were killed, but not many of the apple trees. In our end of the district we have been unable to raise fruit that would keep until time to market.

PRES. F. WELLHOUSE: We have now had trustees' reports from all districts, and would like to hear from the members along the same line any additional matters or discussion concerning the reports.

H. L. FERRIS: I am from the fourth district. Our apples were knotty, scabby, and wormy; ripened too early, falling in September. The best of them were shipped to western Kansas. I want to ask the gentleman regarding the wrapping of trees. I believe it a good plan in my district to wrap, and mound them with dirt. If I lived in the far west I would set a veneering around them and mound them up. I want to ask if the cloths will keep the round-headed borers away? The veneering seems to offer a protection from the borers. Anything that keeps the sun from the body of the tree keeps the flat-headed borers out. They work only in bark that is whitened by the sun, but the question is, how to keep the round-headed borers away.

E. D. WHEELER: I have heard no complaint of the round-headed borer troubling trees that were properly wrapped. I know a man in my district who is growing pears successfully. The first two years he irrigated and now mulches them. So far, he has been very successful with pears. I do not know how long it will continue. In new sections of the country, where people are experimenting, there may be some undiscovered cause for failure. In order that others may avoid mistakes, I think it rather the successes than failures that we should discuss.

J. J. ALEXANDER: The English Morello was the only cherry that was badly injured in my district. I am unable to see any difference between Late Richmond and Morello. No borers have troubled us when trees were wrapped. If our trees are kept healthy they are not as apt to be bothered by enemies as when sickly. I think the member in a measure right on the pear, although I believe Brother Barnes will remember that I sent him some specimens of fine pears grown on two-year-old trees.

E. D. WHEELER: Brother Alexander has dropped what I consider the most

valuable suggestion made this morning. It is, that trees that are kept healthy are safe. There is no nostrum or device that will keep trees as free from pests as good health.

EDWIN SNYDER: Round-headed borers will work on thrifty trees. Flat-headed borers work only on stunted trees. The only protection is to keep them out.

J. W. ROBISON: I agree with the gentleman that thorough working reduces the round-headed borer. I am thankful that I have not seen a round-headed borer in the seventh district in twenty-one years' experience. The round-head deposits its eggs as near the ground as possible; but the beetle is as large and strong as the big blister-beetle or the potato-bug, and has a strong ovipositor. It is very shrewd; it selects the thin bark just above the ground and crowds the egg in sideways. As high as twenty-one eggs are laid within a week or ten days. The eggs hatch just under the soft bark and develop in a little round circle which is easily discovered. They are very easily kept out when the ground on the surface is kept in proper condition. That condition is found after plowing and leaving the earth mellow. If there is a crevice on the surface the beetle is liable to go down in it and lay its eggs. The eggs hatch in about seven days after being laid; then it is easy to kill the worm. Put a knife blade on the bark, press the point, and, if the egg is hatched, a little pressure will kill the tiny larva. The trees should be gone over three times a year. An active man can go over 600 to 700 trees per day. That is the one insect which thorough cultivation and vigor of the tree will prevent, because old bark is very hard, and she will frequently neglect aged trees and work on the younger ones. They continue laying for about six weeks. They are cannibals, for, when put in a bottle, they fight like tigers and eat one another up in a day or two. I found the low ground more infested with them than the upland. In the higher portion of the orchard there will be few. Where they appear they should be carefully looked after.

DR. G. BOHRER: I live in a part of the state comprised by the sixth and seventh districts, which requires perhaps more protection than any other part of the state, but by subsoiling and leaning the trees to the southwest I grew an orchard of 700 trees. I do not put paper nor dirt around them, but planted corn between the rows for six years. I got slough grass, dampened it, and wrapped the trees with it, commencing at the ground and wrapping clear up into the limbs. After five or six weeks I untie it at the top and loosen it. It will last from three to five years. It is cheap and easily put on. On high prairie, where it is from 60 to 100 feet to water, care must be exercised to succeed. The trees are healthy. I laid off the land and put the plow down as deep as three horses could draw it, set my trees deep, and leveled the ground. Many bushels of my apples this year matured right on the ground, so that I cannot get through the orchard with a cultivator. We ran through the orchard with a mower.

PRES. F. WELLHOUSE: How did these apples mature that laid on the ground?

DR. G. BOHRER: They developed in size, but I did not like the flavor. I think I shall trim off those lower limbs. If the trees are given the slant that I spoke of I think they will not lean to the north. Whenever a tree goes over to the north the trunk will certainly sunburn on the south side. We have not had to contend with round-headed borers. Do not think that irrigation is impossible there, because it is not only possible, but it is possible elsewhere in the state where there is a water-supply. Not a quarter-section in my part of the state but what can be irrigated. No one need be discouraged and think fruit cannot be raised there at all. A fruit list here will not apply in our part of the state. Ben Davis is sometimes a success, but I get more Rawle's Janet than anything else.

A MEMBER: Do they all crack?

DR. G. BOHRER: No, sir. I never had them crack all over the orchard. My orchard is peculiar. It is a hit-and-miss arrangement. The Rawle's Janet is not the only apple that will succeed there. Gano I would advise trying. Smith Cider is a good keeper. Shockley bears a good crop, but they are not good to eat until the following spring. The Early Richmond cherry is a success; no better cherries are raised than we raise in central Kansas. I have had more or less cherries every season, and this season we had an abundant crop. I would advise men to cultivate their cherries.

R. N. BAKER: We feed and care for the oriole because they successfully drive off blackbirds and blue jays. The oriole is a success in ridding my place of blue jays.

J. J. ALEXANDER: Plant enough cherries for the birds, too, and they will eat no more than they want. The mulberry is the best bird food.

F. L. KENOYER: How do you drive off sparrows in this county?

MAJ. F. HOLSINGER: The only grapes I get are sacked. We cannot drive them off. They are so early, so late, so omnipresent, that we could not grow grapes at all where I live in the city. The sparrows are not as numerous on the farms and are not a very serious trouble, but, living as I do in the city, the only thing I can recommend is sacking. In a state the size of Kansas there are many conditions not suited to our ideals. The arguments here do not all apply to our locality. The representatives of our little county here to-day are all live horticulturists. To our friends who spoke against raising the Morello cherry, because of the insects, I would say that the curculio is no respecter of varieties. When the Richmond does not show curculio it has ripened before the curculio appeared. If you will leave Richmond on the trees until perfectly ripe, you will find them as wormy as Morello. As to cutting back peach trees, we find this a failure in our vicinity. I know one man who lost 20,000 trees in one block by cutting back. I find no process nor rule that will work with the pear. We have the Keifer pear planted seventeen years, and only one tree shows any blight. They have borne for twelve successive years. We have since planted thousands of them. Some trees stood the winters and others were killed. They go into the winter in a condition which may or may not be safe, as the case may be.

A MEMBER: I ask regarding the planting of the pears mentioned. Were the conditions similar? Was the stock the same?

MAJ. F. HOLSINGER: The stock was A1, from the Huntsville nursery, and all the same, obtained at different times, and why they do not show the effects of the severity of the winter, while others are perfectly worthless, I cannot say.

W. G. GANO (of Missouri): I do not claim credit for anything. If you want an apple that will stay on the tree, where the Janet does well, I recommend the Ingram. It is an early, prolific bearer, a very upright tree, and very much like the Janet. If allowed to overbear, it is inclined to alternate. It originated near Springfield, Mo., and has never been greatly disseminated. I have had them in cold store and been watching them as they came out. They can be kept later in the season, and better than any other. I advise all who want a good keeping apple to try the Ingram.

AFTERNOON SESSION—FIRST DAY.

STONE FRUITS.

By C. V. HOLSINGER, Rosedale, Kan.

Cherries.—In the eastern part of the state cherries of the sour sort may be successfully grown; the sorts that are profitable are limited to four varieties, viz.: Early Richmond, Montmorency, Wragg, and English Morello. The buds are as hardy as those of the apple. A good black loam, well drained, is suitable. We have a large per cent. on clay-kiln land. The cold winter of 1898 and 1899 killed and injured many. Plant small, two- to three-foot trees, English Morello and Wragg sixteen feet apart each way; Richmond and Montmorency eighteen to twenty feet. Harvest in baskets or buckets and transfer to quarts.

Peaches.—The cold weather of two years ago left the trees in poor condition for a crop the past season. Where proper care was given, a fair crop was secured. Cutting the limbs off to mere stubs, as was advocated by many, proved to be a costly experiment to those who tried it. Many trees from five to seven years old never recovered from the effect of such pruning. While those that lived made such a rank growth that few fruit-buds set. The fruit secured was about the same in quality as would have been obtained on two-year-old trees. The average for the season was not greater than twenty-five per cent. of a crop. Some old orchards where not pruned bore a heavy crop, causing the trees to split down badly. The returns were large enough, however, to buy the land and pay for all the outlay. It will not pay to maintain an old peach orchard more than a few years; hence, renew by planting, if practical on new land. The trees will grow on any soil, but we prefer upland. We usually plant southern-grown trees, two to three feet high, although natives will do as well. If planted on land where stones or roots interfere, cut the roots to suit the hole. Do not go to the extreme of leaving on or cutting off too much root.

By F. W. DIXON, Holton, Kan.

Peaches.—The peach crop the past season was not a very paying one; the bearing trees had not yet recovered from the severe freeze of February, 1899. The older trees had succumbed in most cases, and the few neglected ones were in too feeble health to produce fruit. Younger orchards that had been cut back and otherwise well cared for yielded a paying crop. Trees that were cut back only moderately paid best; many orchards cut back very severely yielded no fruit at all, the principal cause being that the new growth had formed no fruit-buds. Trees that were not cut back at all were too weak to set fruit, the blossoms dropping off at end of blooming season. Orchards on unfavorable soil and in unfavorable locations failed to fruit, in most cases. The Champion seemed to be the most hardy in tree and bud, followed closely by Mixon Free, Elberta, Mixon Cling, Salway, and Hill's Chili; but I would not recommend the latter, because of its tendency to rot. Champion was by far the best-paying variety in our orchard the past season. Smock and Picquet's Late yielded very little fruit, and most of it rotted. The Crawford produced some very fine fruit, but crop is ALWAYS light. Not many varieties came under our observation, but the safe varieties to plant are named above. We have a number of new varieties on our grounds not yet in bearing which we hope may be equal to the producer's description.

Plums.—Of all stone fruits this is the most disappointing. The trees are always loaded with bloom at the proper time, but the fruit is so few and far be-

tween that we consider it a failure. Trees have been injured by the severe cold and never will recover. The Japan varieties should have been cut back, like the peach; where thus treated the trees have recovered somewhat from the severe freeze. Only the Abundance has ever produced anything like a paying crop. Wild Goose produced some fruit free from curculio the past season, but not a paying crop by any means. The fact is, we do not like to talk plums, because of their utter failure ever to produce a paying crop for us. But we would advise putting a few trees on every farm.

Cherries.—Of the three stone fruits we write about in this paper, the cherry tree suffered the most from severe cold. There is not a healthy tree in our county over five years of age. Young trees, in orchards well cared for, do not seem to have suffered from the cold, especially if planted in favorable locations, with a good subsoil. The cherry tree will not stand wet feet, and must be planted in a rich, loamy soil, with open, clay subsoil. When so planted it is the surest of any, and will bear every year, after three years of age, until they reach a height and size where all the fruit is produced at the extreme ends of the branches and the picking becomes too slow to pay. The English Morello is the least hardy tree, but most prolific; the Early Richmond is the best paying cherry. Montmorency is a fine tree and produces large fruit, but seems to us a shy bearer. Wragg and Ostheim have no superior qualities to recommend them over the older varieties of sweet cherries. Governor Wood and Windsor seem to have recovered from the effects of the severe weather as well as any cherry, but the birds manage to secure all the fruit after it ripens.

DISCUSSION.

JAMES SHARP: I have planted many plums but have raised little fruit. One thing Mr. Holsinger mentioned holds up a hope to us, and, that is, the chicken and hog yards. I believe that is the only salvation for plum growers in Kansas. A neighbor whose chickens roosted in the trees had a full crop of Damson plums entirely free from curculio. Another neighbor with no chickens had no fruit.

W. B. EAMES: Has any one ever tried jarring the trees? A man in our parts has Damson plums which he contracts to sell every year. He goes over the trees and jars them and his plums are smooth and very nice.

J. W. CURRY: My father had 100 plum trees in Jefferson county, about one-half Wild Goose, one-fourth Miner, and one-fourth Pottawatomie. They have borne six successive crops. In the corner of the orchard is a chicken yard. The trees seem to be equally full, yet at the edge, where the trees are thinner and the cultivation of the corn comes up close, the plums are larger. He has given them no other cultivation.

JOHN FULCOMER: Our experience in Republic county dates back to 1872. We raised peaches successfully there for a number of years. Our peach trees were very full last summer, after the cold winter of 1899. Two trees of Damson plums bore a full crop this year.

A MEMBER: Were they seedling or budded fruit?

MR. FULCOMER: All budded fruit.

MAJOR HOLSINGER: My visit to Iowa was more than repaid on hearing the discussion of "Why do our Plums not Set Fruit?" I recollect when I first planted Damson plums, with Chickasaw in close proximity. We jarred the trees, and to succeed you must catch the curculio on a sheet. I have caught forty at a single jar. We had fine fruit, and did not fail until those trees failed. We have three boys. We buy 10-4 muslin, tear it into squares, slit them up about half way; each taking a corner, we run astride the tree. I gave the tree a jar with my foot; we collected the curculio in bottles with glass stoppers until we were through, when

we destroyed them. This must be done as soon as the fruit begins to form. Do it early in the morning or late in the evening, on the principle that the "early bird catches the worm." In regard to the method of crossing plums by planting trees in blocks, or grafting varieties known to bloom at the same time. The method is, cut a switch, when the sap begins to run. Slice it down on the side, make an incision in the tree and slip the switch into it, and it is not even necessary to tie or wax it. It is so simple that a child may do it. It can be done at any time during the season when the sap will run.

MR. GRIESA: My foreman planted Wild Goose and Pottawatomie plums alternating in a row; he was entirely satisfied with the result; the fruit was fine; but his trees were cultivated.

W. B. EAMES: The point I was trying to bring out was this: The Pottawatomie were at the south end of the row and south of that were Wild Goose, and for several years the prevailing wind blew from the south, and the trees south of the Pottawatomie bore no fruit, while at the north they were loaded. Another year the wind reversed, and trees in the direction of the wind bore heavily.

GEO. P. WHITEKER: I know but very little about plums. We have had but one crop since we set them out. The Elberta peach has been successful with us. We had a good crop last year, but found that they did best if cultivated from the time they were set out.

PRES. F. WELLHOUSE: Did you cut them back?

GEO. P. WHITEKER: We did, but they not do as well. Some not cut back bore better. I make more money out of peaches than any other fruit. The Elberta is best; Champion and Crosby next. The better returns were from Champion. One reason was that it got very dry about the time Elberta began to ripen.

EDWIN SNYDER: Mr. Holsinger said this morning that if Early Richmond and Montmorency cherries were left on the trees the same length of time both would be wormy. I think this a mistake. I left my Montmorency on the trees, and they were almost curculio proof. I suppose the curculio in the peach and plum belong to the same family, and I don't believe Mr. Holsinger's theory will hold. My objection to the English Morello is this: It is of poor quality when not wormy. The only redeeming feature it has is that the tree dies early.

F. L. KENOYER: I conclude that locality has something to do with it. I have English Morello bearing, and worms never trouble them. They are similar in flavor to the wild cherry, and you never see a wormy wild cherry. The Early Richmond and Montmorency are fine cherries. The worms will attack them, and, if left on the trees long enough, will finally destroy them. Late peaches are sometimes wormy.

A. S. HITCHCOCK: I cut back my peach trees and found they were killed back. This season the crop was not large, but the quality was superior, every peach being fine. I got fifty cents per peck, and the trees are in excellent condition, and I believe that with proper pruning I will have good crops from them in the future. I would like to ask whether it is best to plant peach trees where an old apple orchard has been without first taking out the stumps and growing something else on the ground for awhile. My experience is that the peach and strawberry are the only commercial paying fruits.

B. F. VAN ORSDOL: Peaches will grow thrifty and do well planted after apples. I have a three-year-old orchard so planted and doing well. I would let the apple stumps rot out; peaches will do well in such soil. I see there is great difference in regard to the growth and quality of cherries. We have various soils in Kansas, and each will give a different result. Some say you could not raise a

cherry in hard-pan. You can, but the tree will not live as long, and you should ridge up to the tree, so that water will not stand around it. You can best raise cherries in sandy loam, and will have cherries for at least thirty years. I have cherries bearing this year that were planted thirty years ago. I will leave them as long as they yield good cherries. The Elberta peach, on sandy land, must have good care or you will raise more peach borers. The trees will live longer on hard-pan than on sandy soil. I had an Elberta orchard on sandy loam; I cut it back severely, and my trees are still sick—I do not know that they will ever get over it. They were four years old, excepting two or three, and were badly hurt by cutting back.

A. CHANDLER: Some years ago I began planting peaches, pears, plums, and cherries. I received some very attractive looking catalogues. They may have led me astray a little. I think we need a little reform in the catalogue line. I find it quite an easy matter to produce an attractive looking catalogue. It is quite another matter to produce fruit of the same style. I was induced to plant the Japan plum. I planted the trees and let them care for themselves. I also let the curculio care for them. Later we began to look after the curculio, and we had more plums, and they were smooth and salable; sold some for \$2 per crate. The Japan plum is all right where originated. They belong in California, however, and not in Kansas. We have set out many thousands and never made one cent out of them. With the peach it is different. I have grown as fine peaches as any one in America. The Elberta has been the best variety. There are a few others that are fair.

MAJ. F. HOLSINGER: What about the Crosby?

A. CHANDLER: It may do on an eastern slope, but with me they are a dead failure. I found a few fair-looking peaches, but as a paying crop they are a failure. We horticulturists must be more discreet in what we say regarding varieties selected for certain sections of the state. We cannot recommend any one variety for all locations. One strawberry highly recommended in the East has done nothing at all in Kansas. I had one crop of most excellent English Morello cherries. They were large and would rank with any grown in California. That is the only crop they have produced. They were on young trees, on upland, and yielded themselves to death. I agree with that member who said the strawberry and peach are the leading fruits from a commercial point of view.

J. W. ROBISON: Cross-fertilizing the plum is very important; they surely require something more than mere planting. In my orchard, planted for eighteen years, I have always planted some other variety either in the row or contiguous to it, and the result is that the Miner plum has borne a full crop two years out of three. If you plant the Miner plum, be sure it is on plum and not on peach roots. I got wild plums from the woods and planted them alternately. Some seedlings of those trees are so cross-fertilized as to change the flesh of the plum. Some have the outward appearance of the wild plum and others have the appearance of the Miner. The Mariana would not cross-fertilize, and this year I did not have a peck of Mariana plums. A neighbor of mine catches the curculio thus: Each tree has a limb cut to a stub; then early in the morning he, with three men or boys to help, would take a sheet and gather it around the tree, holding the corners up; then with a wooden mallet he gives the stump of the limb three taps. Thus from tree to tree he went over the whole orchard, afterward disposing of the curculio which were caught. It has been my practice for the last twenty years to plant peach trees where apples have grown, and with good results. Now, as to pruning, I understand that the California system is practiced exclusively. This method is to clip off the end of the branch. It re-

quires considerable judgment to know just where to cut. There are no fruit-buds on the lower half of the branch. All fruit-buds are out toward the end; if cut back much, there will be practically no fruit-buds left. The buds will probably be destroyed if you cut back severely, and you will be almost sure to get little or no fruit the next year; but if you cut back the next year, you will get size of limbs and trees into fairly good shape. These things must be judged by the location of the bud. A few years ago I had a peach orchard where an apple orchard had been, and the trees were large. With an ax I cut back the trees, and this year secured a good crop of peaches on them.

J. L. WILLIAMS: I have had several hundred trees of Wild Goose, Miner and Chickasaw plums for something like seventeen or eighteen years, and have never failed to have a crop if they bloomed. I presume they cross-fertilized.

R. DE GARMO: I have two trees of the Long White Chickasaw(?). They have for three years furnished my family with all the plums they could use. They are curculio proof.

S. J. BALDWIN: I do not like to pass the Japan plums in a discouraging manner, considering their importance. I live in Nemaha county. We have a peach crop about once in four years. For the last twelve years my plum crop has never failed. I am not growing plums extensively, only from six to twelve crates per day during the plum season. The plums that do the best for me are the Japans. I use some remedies not mentioned here to-day. One is, tying bands of building paper around the tree. Another is, sowing air-slaked lime broadcast over the trees and the ground until both are white with it. This I do twice a week from the time the blossoms fall until the plums are three-fourths grown. Burbank does best for me. I sold them this year at two dollars per crate of twenty-four boxes. I have call for more plums than I can furnish. The most perfect plums—least affected by the curculio—are Golden Beauty and Ogon. Both are fine, but Burbank cannot be excelled. I defy any Californian to excel them in beauty or size. I had one Burbank tree planted two and one-half years ago from which I sold \$6.50 worth of plums.

J. M. GRAVES: The secret of success in growing peaches and plums lies in the ripening. If your ground is properly mulched and in a shape to carry off the water from the roots of the tree as it falls, you will have no rot. I grow Japan plums, and to succeed there must be clean surface cultivation, allowing no weeds to grow, and keep them so that the water will run away from the roots. [The character of the subsoil must effect this.] I spray my trees with lime.

J. W. GREEN: I succeeded this year in raising two-dollar peaches by occasionally throwing water on the trees, and by mulching. One-half of my trees were mulched. Last year they grew in grass land.

CARE OF ORCHARDS.

By A. H. GRIESA, Lawrence.

Presuming the orchard to be grown to bearing age, the time when it should return cost expended, is the vital one to all.

Cultivation and fertilization should have proper attention; then trimming should be judiciously done, also care of diseased trees; and the destruction of insects, as well as the proper picking, handling and sale of fruit, all are of vital interest. At this age of orchard growth excessive cutting should stop, and seeding to clover for a short period may be adopted. Young stock, such as calves, pigs, sheep or Angora goats might range there, thus keeping down any large growth

of weeds or clover (which harbors insects), trimming the lower branches and eating the prematurely fallen and wormy fruit.

The most serious pest of the fruit-growers almost the world over is the codling-moth, which hibernates over winter in crevices of barrels and boxes, under the bark of trees, or in rubbish under them; and in which state it is a very good time to kill them. This may be done by burning sulphur in the cellar or storehouse in early spring; by bandaging trees late in summer; or, beginning in June with tree bandages of any coarse paper, newspaper, or burlap, and going over them every two weeks, killing all larvæ found under the bandage. Before putting on bandages the tree trunk should be scraped and all rough bark removed. Insects there in late fall will be found by birds before spring. I find this tree bandage an excellent trap for them to get in, and birds find them. But young stock will eat a large proportion of those that fall, and stop their increase; besides, when not overcrowded, this makes good range for young stock, and I verily believe it is what every orchardist must adopt to grow fruit. Of course all caterpillars' nests should be burned as soon as discovered. One safeguard against borers is a small, smooth mound of soil around the trunk, which keeps the borer high up and easy to find and destroy.

Our dry climatic conditions are excellent for the production of noxious insects and we must constantly fight them. In dry seasons cultivation should be maintained in an orchard deep as a cultivator or disk harrow would reach, but not deep enough to break many roots. Such cultivation is essential to the fruit crop of that season and more so for the crop to follow the coming year. With such culture, sorghum, cow-peas or soy-beans may be broadcasted and the vines plowed under in the fall, before or after the first frost, or the crop can be mowed and partly removed. I am trying sorghum sown late with excellent prospects. This, with stock pasturing, will make all the fertilizing ever needed in the West. Be sure to turn under or burn all rubbish each year.

Trimming should be done to keep the trees in good growth, not too dense on top; nor should it be done too much at one time, nor just before the buds swell. The proper time to trim is in early fall, before the leaves drop, or during mild winter weather. Any limb not making a good growth, or that chafes with the others, should be removed. Trees should be kept in proper shape from the start, so that the use of the saw would seldom be necessary. Do not encourage high nor thick tops, which yield inferior fruit, costly to pick. Fruit, to be well developed, needs air and sun.

As to picking fruit, the commission men are very good advisers how to pick and assort, and many use such advice to cover up their reports of poor sales; but fruit should be carefully picked and assorted into two or more grades, and used or sold accordingly. The poorer grades should be used for evaporating, which may be done in any large orchard to advantage, and some use made of all low-grade fruit, even if no other than stock feed, as it becomes a large part of the crop. All fallen fruit of any age should be removed, if not consumed by stock, and be put *under* the compost heap.

Diseases of fruit-trees are not so well understood as they should be, and little is done to prevent or stop them. Blight is one of them. It has been discussed much by interested people, and yet it continues. Some rules can be suggested as helpful. One is, do nothing to force the tree's growth; do not cut it out as fast as it appears, but wait until dead or dormant and then remove it. Be patient and persevering in your plan (if good) in your care of the trees; notice the successful growers and study what leads to their success, and good results will come. Also notice the failures of some, and try to avoid the causes that lead to them.

PICKING, PACKING AND MARKETING APPLES.

By EDWIN TAYLOR, Edwardsville.

The big end of labor and expense that goes into an apple crop is incurred in the picking, storing, and marketing. Picking apples is, or should be, a "hurry-up" job. Every tree in the orchard of the same variety is ready to pick at the same moment, and should be picked the moment it is ready. Every hour that the picking of an apple is delayed after its clock has struck brings deterioration. In an orchard of one tree it is easy to accommodate the harvest to the requirements of the crop. But where people have several hundreds or thousands of barrels of one variety it is both difficult and unprofitable to practice such dispatch. For even if we assume, like a political economist, that labor is a sort of fluid which can be turned off or on at will, the equipment for apple picking, the ladders, picking sacks, baskets, sorting tables, barrel presses, and all that, becomes an intolerable expense where they are provided in such abundance that a day or two's use in a year is all that is required of them. Most apple growers allow from two to four weeks for the apple picking. It has been reported that in 1897 the yield of one of the large orchards of Missouri was 120 car-loads of apples, and that they were all gathered and either shipped or put in store in ten days. Such expedition can only come with fine generalship and a perfect system of procedure.

There are different systems of picking, and there is much picking without system. The system followed grows in interest and importance as the number of people engaged is increased. Where the "old man" works alone it is no great matter how he proceeds, but where the force is one hundred or even a dozen hands the question of profit or loss may hinge upon whether that force works with the precision of an army or the discursiveness of a mob.

Some careful operators pick into baskets, and in turn hand the baskets thus filled to the packing-house or place of storage. But in the main apples are picked into seamless grain sacks, prepared for the purpose, with a heavy wire sewn into the sack mouth for the purpose of holding it always open. Before this wire is put into place in the mouth of the sack, a ring an inch or so in diameter is bent into it. This ring is for the purpose of engaging a harness snap attached to a short rope or strap, the same being tied to one corner of the closed end of the sack; the purpose of it all being to provide a thing by which the picking sack can be suspended from the shoulder and expeditiously unslung for emptying. The workman will adjust the length of this tackle to correspond to his own length, and should be forbidden to throw the sack over his head. In apple picking time is too precious for unnecessary movements.

Where apples are barreled in the orchard, the picking gang with portable sorting table keeps even pace with the pickers, the latter emptying their sacks as fast as filled directly upon the table. The sorting table is constructed with a slat bottom, slats half round, one inch by two inches, set one inch apart. A good size for the table is three feet by six feet. Sometimes they are made even longer, up to twelve feet in length. The sides of the table are six inches high. Its outlet is provided with an apron, which enables the packer to let the apples drop into the barrel without bruising. A piece of plank for the barrel to stand on while being filled and on which it may be frequently jarred, is an essential part of the equipment. The great advantage in this method of packing lies in the fact that it involves less handling than any other possible device. Its disadvantages, as compared with a permanent or temporary packing-house, are serious. With a packing house the barrels are kept dry; the work of barreling is not interrupted by a

slight shower; the culls are brought to one place, and, most important of all, the grade of the stock can be made to run much more evenly than with the orchard pack.

It is more and more apparent that where any considerable quantity of apples is raised there should be a permanent structure for receiving the apples, if not for storing a portion of them. A common form of apple house intended for storage is two storied—one story above ground and one partially below. The underground story will, of course, be frost proof; the upper story must be made practically so by hollow walls, sawdust packing, air spaces, or whatever method is used. In both stories bins are arranged on each side of a central alley. If the bins are single decked, the apples are often piled up four feet deep by six to ten or twelve feet wide, according to the width of the bin. Such houses are often constructed double or triple decked. In such cases two and one-half feet is a common depth for the apples in the bins. Such a building must be fully equipped with ventilators and double sashed windows. If the ventilators are carefully kept open at night and shut by day, the temperature can be surprisingly controlled, and in ordinary seasons apples are often carried through to January 1 or even to March 1 without extraordinary loss.

Where apples are placed in farm storage the gathering is much simplified. Supposing the picking to be done in sacks, the hauling is done in barrels having but one head, on wagons fitted with barrel bottoms. The barrel bottom is made of two-inch planks bolted to crosspieces. It has no sides, but instead poles are secured to the top rings of the wagon stakes, in such wise as to be instantly detached, if desirable to have the pole out of the way for unloading. The ends of this rig are secured by ropes. If the "barrel bottom" is fourteen feet long it will hold sixteen barrels, which is enough for a load.

To make the apple harvest "go" with economy each picking gang should consist of sixteen men and a boss. They will take four rows of trees at a time, and at each remove will take four trees in each row—sixteen trees, with a man for each tree. The wagon will keep along with the pickers, taking its stand every time in the center of the sixteen trees. The boss and driver will receive the apples from the pickers and carefully pour them in the barrels. There should be wagons enough so that the work may not be interrupted for want of transportation. The boss may take charge of the wagon while it is loading and turn it over to the driver when loaded. In that way one team can be run without a driver. The manner of unloading will depend upon the construction of the storage house.

When there comes a hot fall, like that just passed, when it hardly froze at all in November, the anxious orchardist longs for cold storage. And where fruit is perfect and intended for the late market and the cold storage complete, then it ought to be satisfactory. The charge for cold storage is commonly forty to fifty cents per barrel for the season to May 1. Freight, switch charges, shrinkage and unpacking will commonly make the cost about seventy-five cents per barrel.

Thrice and four times happy is the apple man whose fruit is near enough to a good market so that he can sell it in person, or by proxy, from his own wagon. Then everything goes at some price—culls, windfalls, seconds, and firsts. He pays neither freight nor commission. Most orchardists have harder ways of making sales. Some are harder than others, but the hardest of all is where the buyer is furnished the apples in piles for him to paw over at his leisure and select or reject according to his fancy. Apple buyers of that variety should be shown the door that the lightning-rod peddlers go out. Before negotiations for a crop of apples are concluded, a perfect understanding should be reduced to writing,

specifying what is to go and what is to be thrown out; and before the farmer signs, he should insist on seeing, good and plenty, the color of the man's money.

David Harum has left for our instruction and guidance the observation that he always found it profitable to allow the other man to make a "leetle." The wisdom of such generosity has a more emphatic application to transfers of extra-perishable property like apples than to the more stable assets afforded by "losses"; and it is possible that our fellow-craftsmen are inclined to be too "near" for their own good in dealing with apple dealers. The risks, losses and friction in handling this line of goods indicate large margins. Whenever a gentleman of responsibility makes a fair offer for an apple crop he should not be allowed to get away. However the orchardist concluded to dispose of his fruit, there is one incline he should not venture upon, one chute he should refuse to shoot, and that is the declivity offered by the commission merchant. The Delilah that keeps her country victims financially short-haired is the commission Delilah. Her ways take hold on hard times. Like the darkey's bear-trap, the commission trap catches us "comin' and goin'." It first breaks up legitimate trade in our line of merchandise, and then, as a rule, more or less mulcts us of what even a crippled market should by rights return us.

Nothing so operates to prevent local dealers from putting their money into the varied products of horticulture as the constant menace held over them, like the sword of Damocles, that their competitors down the street are liable to be loaded up at any moment with more of the same stuff than the market can bear, which has n't cost the receiver a cent. We are the only people in business who rush their goods upon the market without an agreement as to price.

The basic idea of commission selling is wrong, because it puts the consignor entirely in the power of the consignee. "Power," as Mr. Buckle observed, "is always abused." It is abused on Commission street to such an extent that the returns made by half the houses there are commonly "cooked" some. If we could only get it hammered into us that every shipment we make to be sold "E. and O. E." is a stab at our best friends, the men who buy to sell again, and at the same time an invitation to the consignee to help himself out of our pockets, we should be rid of a worse pest than the San José scale or the codling-moth.

The horticultural output of this country is enormous and the consumption is also enormous. The consumption is greatest when it is fully and regularly supplied at fair prices. This fair supply the produce dealers can be depended upon to furnish. Their conservatism will be insured because their own money will be at stake. When we flood a town with commission stuff we ruin the dealers and injure ourselves. Our great bug-bear is the fear that our fruit will rot on the ground. Is it not better for it to rot at home rather than 500 miles away, after we have paid freight on it? Apples on the ground represent only a limited outgo; but when in addition to this original cost is added the labor of picking, sorting, packing, hauling, cost of packages, and freight charges, we have a large investment—too large an investment to be consigned.

As a final word, many orchardists practice a false economy in saving their fruit at a loss. Whenever cider apples or evaporated apples are going at less than they can be delivered for with hired labor the rot process of disposition should be introduced, except that where the farmer himself or his minor children have no other gainful employment, then the farmer and his kids will find even half wages the same as something found. But when people have paying jobs, their cider apples at twelve cents per hundred delivered on the cars or their evaporator apples delivered at the factory for ten cents per bushel will bring them nothing for their fruit and less than cost for their labors.

DISCUSSION.

E. J. HOLMAN: In my experience for thirty years in this state, I believe that the cause of much of the unfruitfulness of our orchards is the worn-out condition of the soil. Trees that have had crops growing among them and the ground stirred have had new life added to them. Cultivation thus received reinvigorates the trees and puts them in condition to become fruitful again, and I think that, throughout the eastern portion of this state, thousands of old trees, neglected as worthless, might, by proper cultivation, be put in a condition of profit.

EDWIN SNYDER: I have had some experience in picking, packing and handling fruits, and expect to have considerable more if I live long. I agree with Brother Taylor, except that I prefer to pack in the orchard. I always have a wagon to haul the apples right to the packing shed, where they are out of the wind and weather. I believe it more economical than to build a storehouse, to be used only a few weeks in the year. The package we use now for peaches is the eight-pound grape basket, which costs about three cents each when the handles are on. These go on the market in good shape and are handy for the consumer. You will find a better market for one-sixth of a bushel than a bushel. In packing, I would advise always to put the best peaches on top, because I know you will do it anyway and the consumer expects it. It has always been my practice. I learned it from the commission men. Brother Taylor roasted the commission men and I am glad he did. We place everything in their hands—a great temptation. I believe the commission man is as honest as the average farmer. I heard some one talking to a hay dealer once about the "honest farmer." Said he, "Do you see that pile of stone? I got them out of a load of hay I bought of an 'honest farmer.' I am going to build a monument to the 'honest farmer.'" Put your big berries on top; every one expects it. I want to say something about boxes for packing fruit. One year I got the notion that I would sell with dry measure instead of wine measure. That year I had a fine crop of cherries and used the full-quart boxes. I called the attention of the commission man to it, and he wrote back that I had better burn the boxes, because he had always to explain to his customers, and they were used to the small boxes and still wanted them.

A. E. DICKINSON: This is a day for division of labor in most all kinds of business, and not having this subject divided, or any instructions from the chairman, I have simply undertaken to give the few things that I do know concerning the storage of fruit, and hence you will not be surprised at the brevity of this report. I had my data jotted down on a paper which I find has disappeared. The farmer who attempts to hold his produce after it has matured and is ready for market and beginning to deteriorate becomes in one sense a speculator. I am *not* a speculator, and whenever my produce is ready for market, and I can get good prices for it, unless I have good reason for believing that the price will advance in a reasonable time, it goes. My experience is confined chiefly to apples. This year I sold mainly from the orchard. I put some of them in cellar storage, however. A few I put in cold storage for our own use, and I now give the results, and each one can draw his own conclusions as to whether it is better to sell or place in any kind of storage. I placed some No. 1s, seconds and wind-falls in a large cellar eight feet deep, with good ventilation. A short time ago I found I had lost one-fourth of the seconds that I had put in, and one-eighth of the No. 1s. About one-half of those thrown out were "specked," and might be used at once. The hand-picked apples I put in cold storage. I brought out six barrels to-day and opened them in Mr. Whiteker's store to find the extent of loss, and as far as we went down we found only two apples that were specked. Two barrels are now in the exhibition rooms.

J. W. GREEN: What variety?

A. E. DICKINSON: Two barrels of Winesap, two Jonathan, one Missouri Pip-pin, and one Ben Davis. I have taken much interest in what is called cave storage. A few years ago, at a meeting of this Society held at Lawrence, Colonel Evans reported on cave storage. This fall I wrote to him to get his experience of the past few years. He reported that he sold early when he could get a fair price, and hence he had not used his cave all the time, but had found it a success. He reported that a neighbor was still using his cave and that he took his apples out late in spring and received \$5 to \$8 per barrel. A gentleman at Lecompton has constructed a similar cave and I have asked him to report at this meeting the condition in which he found the fruit. I got a letter from him saying that, owing to the condition of his fruit in the fall, he was not expecting much from the cave. I believe this matter of cave storage, if a success, will be of great value to growers of apples. Other methods of disposing of fruits are drying and evaporating. I have had but little experience with either. In our family we can apples and flavor them with white ginger root. Sweet apples should be cooked slowly a few hours in a light syrup with bits of broken ginger, and then canned. We prefer this to preserves. Pie-plant is more palatable if flavored with either dried or fresh raspberries. Cook them together and strain through a colander and can for later use. [Some were exhibited and tested.]

A MEMBER: In this pie-plant and raspberry preserves, what proportions do you use?

A. E. DICKINSON: According to the taste of the person putting it up; a very small amount of raspberries will flavor much pie-plant.

B. F. VAN ORSDOL: Had you kept your apples you sold in the fall until now would they have brought more money?

A. E. DICKINSON: I think I should have gained by keeping them. I lost three-fourths of my Ben Davis with bitter rot; hence my experience on this account would not apply generally.

G. P. WHITEKER: Mr. Dickinson forgot to mention that we opened the barrels at the bottom, as we knew the best would be in the face of the barrel, but we found no rotten ones.

G. W. MAFFET: I object to an observation made here that a fruit-grower who holds his product after it is ready for market is a speculator. I consider it the duty of every fruit-grower and farmer to hold it until the last moment, for the benefit of those who cannot afford to hold their fruit. The same is true of cold storage. We all know [?] that the price never increases until the product is out of first hands. The grower is entitled to the best price to be gotten for it.

A. S. HITCHCOCK: On one point in pruning I differ with the gentleman, although he did not give details. He said prune in the fall. I prefer pruning in the spring. One is to thin the fruit, the other to shape the tree; so if we had a severe winter it may affect the pruning of the tree. If pruned in the fall, he must do it on a presumption as to what the winter will be. I have experimented by sowing cow-peas late in the season, say in August, when you think the time has come to quit cultivation, and they make excellent, clean feed for cows, or you can leave them to rot on top or turn them under, according to your soil.

J. W. ROBISON: Is not your time for sowing rather late?

A. S. HITCHCOCK: If you want seed, you must sow earlier. I speak of the plant for forage.

J. W. GREEN: I had the pleasure of attending the state horticultural meeting at Champaign, Ill., and their conclusion was that scab fungus and bitter rot lurk

in the cow-pea the same as in the apple leaf, and they recommend burning the cow-peas, or that they be not allowed to remain under the trees.

CHAS. HARRINGTON: I believe trees should not be trimmed while in a dormant state, but rather in a semidormant state; others seem to entertain a similar opinion.

A. L. ENTSMINGER: One thing not yet referred to is in regard to keeping fruit of all kinds and preparing the packages. In a common cellar I have kept grapes until the 12th of March by dipping common wrapping-paper in Bordeaux mixture, letting it dry, and laying the grapes upon it. I think that to wash the interior of barrels with Bordeaux before sorting apples into them is a good plan. I think we can keep our own fruit better if we properly prepare for it.

PRESIDENT WELLHOUSE: Give us your experience with grapes in cold store.

A. L. ENTSMINGER: I find that they should be picked while slightly green. Some grapes stand it better than others. Grapes picked somewhat green and placed in cold store come out in fairly good condition. I sold 200 or 300 baskets [from cold store] at eleven cents each; the same as I sold for seven and nine cents when first gathered. I think that every basket should be lined with paper saturated with Bordeaux.

F. L. KENOYER: Has any fruit grower here tried dipping paper in copper sulphate?

J. W. GREEN: I am making an experiment this year by dipping [fruit] in Bordeaux and then soapsuds. I know that soapsuds will coat an apple over and keep out the air entirely.

NEW FRUITS AND NOMENCLATURE.

By C. A. CHANDLER, Argentine.

The nomenclature of fruits at times seems quite mixed, which often gives rise to considerable confusion; this, however, is not so common now as it formerly was, partly because of the thorough discussions in our horticultural papers and partly because of better organization of the horticulturists and of their following the rules of the American Pomological Society. The fact that a fruit is found with several names is proof of its superior value, it being carried from place to place and given different names. Another way nomenclature may become mixed is through what is known as bud variation, which produces "strains" of the same fruit.

There seems to be a general misunderstanding as to how strains come about when propagation has been by buds, which are said to produce the same as the parent, but if we get at the facts it is quite simple. The fact that there is a constant tendency to variation in the vegetable kingdom will account for the different strains of the same fruit. We all know that there is great variation from the parent when seeds are planted, especially in horticultural products; but perhaps it is less known that there is also a tendency to bud variation. We say when we propagate by bud or graft that we are sure to perpetuate the variety, but it is a known fact that trees grown where the conditions are not the same will vary largely from the original type. This may be the cause of a difference in plant-food, a difference in climate, or perhaps the propagator has had in mind a different ideal for which he is breeding. So we can safely say that strains come from bud variations, and hence would follow a mixture of the nomenclature. There are now in existence different strains of the old Wilson [Albany] strawberry which differ as much as some varieties, and none of which are exactly like the original. Here, I might add, lies a great future for breeding up of varieties to ideal types.

Now as to the new fruits of the year, the catalogues have their usual large list of novelties, which are yet to be tried before their value for our soil and climatic conditions are proven.

The following list of fruits are not these novelties, but fruits which are only comparatively new and have all been at least partially tried, and which we can feel safe in recommending, but it is not to be taken that these will take the place of our older sorts, but simply become an addition to the list of profitable sorts.

New peaches: Sneed, Greensboro, Triumph, Fitzgerald, Matthew's Beauty, New Prolific, Captain Eads, and Carman.

New grapes: Hicks, McPike, Campbell's Early.

New raspberries: Red—Miller and Cardinal. Blackcaps—Cumberland and Munger.

EXPERIMENTAL HORTICULTURE.

By E. J. HOLMAN, Leavenworth.

Horticulture, live, profitable horticulture, is a thing of constant experiment and improvement from seed or planting time until harvest, and the harvest includes the collection or possession of the last sale.

Horticultural work and profit are in these days over rough seas; practically, the road is very uneven and hilly. Hence, the necessity of constant study and intense application.

Our failures are mainly attributed to the fact that we do not apply what knowledge we already have; it is also a fact that our success in horticulture comes only from a full use of all knowledge gained. And like the faithful servant who made his pound gain ten, so we find ourselves similar gainers. But we must not trust too much to the experiments of others; we too often fail in making their experiments ours. My neighbor, with his vigorous and productive acres of berries, his vineyards and orchards, may, and should, excite my surprise, interest, and encouragement. I may properly inquire and learn of him, and after he has, without reserve, given all information, I should then be better equipped to commence business, and, if properly observant, will be; but two men never see or do alike, nor will what I have learned from my neighbor any more assure me of success than a college graduate reciting his lessons to a comrade can make him a graduate. It is a trial or experiment from the beginning.

First, the soil and its preparation; it may be too loose or too tenacious; it may be poverty-stricken or it may be excessively fertile. Can one understand his soil until experimented with? In agriculture, with annual crops, it is not so much of an experiment, but in horticulture, where little is annual or biennial, but mostly perennial, much more has to be taken into account, as winter mulching, layering, and divers protections. Spring and summer, often hopeful, meet disaster and defeat in autumn and winter. Here is an experimental study for one who can tell or foretell the severity or mildness of a winter.

There is no fruit grown in the temperate zone but what has suffered injury, and probably will again; and yet there has never been a summer so dry or winter so cold but some practical, thoughtful experimenter has carried plants and trees through, and was always rewarded with great profit.

In the matter of varieties of fruit the same problem exists. Bestow the same care and attention on the same varieties that have so greatly succeeded with your neighbor, and with you they fail. Will you be discouraged and give up? If not you must experiment; treat your soil differently; try other varieties and different methods of culture. It is a case of constant, undivided and steady experi-

ment, and not a copy of a finished problem from a comrade's book, that is to insure one's success.

I never knew before that the word "experimental" as applied to horticulture was so comprehensive. But on experimentation we find that all horticulturists who have distinguished themselves have been original, thoughtful, practical experimenters. And the mistake—the great mistake—made by the majority is in copying the plans, instead of the character of the one that originated the plans.

Successes in horticulture are not mishaps. One man may tell another how to plant, but he does not know true planting until he has planted and obtained good results. A man claims a certain variety is best; it may be with him, but it may not do the best with you. You will have to experiment with it to ascertain its value to you.

One man sprays and destroys all noxious insects; another man sprays and has no such result, and straightway condemns spraying. The first man was a persistent experimenter, the other a copyist.

'T is not all we read or hear or see, but what we do, that determines results and profits and pleasures.

EXPERIMENTAL HORTICULTURE.

By B. F. SMITH, Lawrence.

Experimental horticulture embraces all sorts of fruits, plants, and flowers, including garden-truck, etc., but the writer will endeavor to make only a few brief observations on the line of his work in fruit-growing. That some progress is being made every year in experimental horticulture is not doubted. When the writer remembers and compares in his mind the two or three varieties of strawberries grown thirty-three years ago with the twenty or more sorts that we now grow for market, and the old Miami and Doolittle raspberries, with the Kansas, Gregg, Cumberland, and other new varieties, we would reiterate that berry culture has made rapid strides along all its branches. The ideal strawberries then would not bear comparison with our Bubach, Marshall, Clyde, Bisel, Splendid, Parker Earle, Warfield, and others too numerous to mention.

While it required from sixty to ninety berries of the old Wilson, the great market berry of those days, to make a quart, to-day we have several sorts of which fifteen to twenty-five berries make a well-rounded quart.

Still, experimental horticulture is seeking for higher ideals in all our fruits. In fact, there is no limit to the ideal fruit. It was said that we had it in the Jessie strawberry; a little later it was the Jewell, followed by the Bubach, Pearl, Haverland, Woolverton, Timbrel, Marshall, Splendid, Glen Mary, Brandywine; yet these and many others have fallen below the first estimate of their value. We thought we had the ideal for an early sort in the Michel. Then we discovered that the Excelsior had three or four days' advantage of the Michel in earliness. Now it is thought the Johnson's Early will precede Excelsior.

It is thus that experimental horticulture continues seeking for perfection, or the best that "dame nature" has in store for all her votaries. Hence, let us not hinder experimental horticultural work. We may never reach the ideal; in fact, we never will; but the pursuit of it will keep us employed, and it will enlarge our understanding and widen our influence.

In 1859 or 1860 a half-dozen bushels of black raspberries glutted the St. Louis market. A man came from the vicinity of Cincinnati and leased some land nine miles east of St. Louis. He planted two acres of Miami raspberries the first year. The first few crates gathered the next year found no purchaser in the city

of over 100,000 inhabitants. They were left with a huckster to sell, if possible. A few were sold and some handed around for trial. They were found to taste well and make good pies, yet the first crop on the two acres sold very low in comparison to what the purchaser received per bushel two or three years later. Not discouraged by the low prices in the first venture, the planter set four acres more, and by the time this patch came into bearing the demand and prices had increased. As the demand increased, the grower raised the price to five and six dollars per bushel, and the acreage above forty acres. As soon as the taste for raspberries became established, the first planter of this fruit always had a corner on the market and made prices to suit his taste. He soon became the owner of 200 or 300 acres of rich bottom land, nine miles from St. Louis.

A late writer in *Harper's Monthly Magazine* estimates that \$80,000,000 was paid for strawberries in this country this year. While we are inclined to think the writer is forty millions over the mark, yet forty millions value of berries is probably more than all the rest of the world consumed in the year 1900. This marvelous growth in berry production and berry consumption is the outgrowth of experimental horticulture, which has not originated as many new apples as it might. One of the needs in the Missouri valley is for new winter apples. The Baldwin, Newtown Pippin, and Spy, so highly prized in the north and east, are only fall apples with us. The Ben Davis, Missouri Pippin and Gano are attractive, but they lack flavor and are poor keepers, and are in fact only second rate. We need a large, crisp, red apple, that will stand transportation and keep well, without having to be stored in ice-houses. The writer is aware that it would take long years of patience, money and toil to gain the fruit that would suit all tastes; yet there is not a more inviting field for some young man who has a little money than to embark in this department of horticulture.

Think for a moment what E. W. Bull did for the country when he originated the Concord grape. Its value is almost beyond computation. Were it not for the Concord, the poor man would hardly be able to get a taste of the fruit so often referred to in the Bible. The Concord's greatest good is in its being only valuable when eaten direct from the vine or from the original packets in which it is shipped, and not for wine. The experimental horticulture is the forerunner of that larger fruit culture that we call commercial, including vineyards, berry fields, and great apple orchards.

Thirty years ago the Miami and Doolittle raspberries were the leaders for the market. The interval of a week between the Doolittle, the earlier of the two varieties, and the last picking of the strawberry, has been overcome by experimental horticulture, in the production of earlier-ripening berries of both kinds. There is not now a lapse of a week made by the earliest raspberry after the last picking of the strawberry. The Kansas and Cumberland seem to be leading in size and productiveness, while the Egyptian and Progress are the earliest, and the Gregg latest.

In experimental horticulture, we have produced a blackberry that is the equal of the old Kittatinny; being free from rust, we may call it the long-sought-for ideal blackberry.

In our experimental work there were about a dozen new varieties of strawberries planted on our grounds last spring. One of Kansas origin, and named Kansas, cost five dollars per dozen plants. Whether good or bad, it will not weaken our faith in Kansas. A new blackberry of Texas origin will show what it can do on Kansas soil next year. Among our 3000 young pear trees are several that have never fruited in Kansas; some of them are dwarf varieties. The writer has been a patron of originators and introducers of new fruits for thirty-three

years. Many unprofitable kinds have been tested to find the valuable one; yet the expenditure of several hundred dollars in the cost of plants and their culture is well repaid by the valuable varieties discovered.

Experimental horticulture will live as long as the country does. It founded our great parks, ornamented our door-yards, planted our berry fields, vineyards, and great apple orchards.

Experimental horticulture makes bright the cities of the dead and strews flowers over their graves.

DISCUSSION.

GEO. H. VAN HOUTEN, secretary Iowa State Board of Agriculture: Major Holsinger has suggested that I give a brief history of experimental horticulture. If you lived in Iowa you would not only hear "experimental horticulture," but, as I have been, you would be filled with it, if you heard as much as we have heard about it. Much attention has been given to cross breeding of Grimes's Golden, Jonathan and Ben Davis apples, in the production of new varieties. I was secretary of the Iowa State Horticultural Society during several terms, also manager of the state experimental work for a considerable time, and know something of the work done. If you ask me as to results, and if the results justified the expenditure of time and money, I answer No. The multiplication of varieties is easy. Much of this experimental work is somewhat theoretical. We have produced several varieties of flowering plants. Crosses have been made with *Rosa rugosa*, until we claim we have made a decided gain very much in the way of beautiful foliage. A most important question with us is, "Will it endure the climate?" When I come down here and find you have similar difficulties to contend with, I feel that we are not alone.

I am surprised at your small list of reliable cherries. In Iowa we could name a list of fifteen varieties that meet our requirements better than any named here. I think that Iowa and Nebraska far surpass Kansas and Missouri in cherry culture, both in quality, quantity and commercial value prolonging the season of the English Morello. Speaking more fully of the apple, it has been the ambition of the Iowa growers to get an apple with quality of the Jonathan and keeping properties of Ben Davis. An absolute cross has been made; it is not a chance cross. We have tens of thousands of this cross. You can take the pollen of a tender variety and apply it to the pistil of a hardy variety and produce a cross of as decided hardness as desired; we are beyond the time of theory, and are at last near to the time of absolute success. We have also experimented with plums. People across the Missouri river are working just as energetically to that end as we. We find people who are raising plums by the thousands of bushels. We find people who are raising thousands of varieties. I do not mean thousands of *plums*, but thousands of varieties.

I cannot say too much of the large mindedness of Mr. Terry, in giving freely to the world the result of the investigations he has been carrying on for years, with no desire for financial gain. I have seen Japan plums in their native country covered with ice half an inch thick, and then come to full fruitage. I believe the great Creator makes no mistakes. He intends us to search out these things. I have examined them possibly with more interest than most of you. It has been my business for twenty-five years to make records. I claim no credit for placing on record the results of many experiments it has been my privilege to make for the benefit of others.

EVENING SESSION—FIRST DAY.

WHAT TO DO WITH CULL APPLES.

By H. L. FERRIS, Osage City.

As is skim-milk to dairymen so are cull apples to the horticulturist. The experience of the Kansas horticulturist during the past two seasons has called his attention to the problem of how to dispose of cull apples. Doubtless many of you have resolved to raise less of them next year. A few of you had apples of good quality this year, and attribute the cause to spraying, while others had good apples without spraying. A part of my apples were sprayed three times, and yet were the poorest in quality that I ever had. The common way of disposing of cull apples is to sell the best to evaporators and canners, make the balance into vinegar by leaving the barrels in the backyard until the hoops rust off and it all leaks away, while salesmen from vinegar factories fill our towns with uncertain liquids marked [cider] vinegar. Gentlemen, we need a pure-food law.

[Paragraph 345, chapter 100, page 359, volume 2, of the Statutes of Kansas, reads as follows: "Every person making or manufacturing cider vinegar shall brand on one head of the cask, barrel or keg containing such cider vinegar the name and residence of the manufacturer, and the words cider vinegar; and any person or manufacturer who brands any cask, barrel, keg or other vessel with the name of cider vinegar which contains any liquid other than pure cider vinegar, shall upon conviction be fined not less than \$50 nor more than \$100 for each barrel, cask, keg or other vessel so branded."—SEC.]

There are five ways in which to dispose of cull apples. It seems as if all these ways combined ought to dispose of them as well as skim-milk is disposed of when fed to pigs and calves. Such is not the case, as thousands of bushels of apples waste on the ground every season, and Rawle's Janet hangs upon the trees until the middle of the next summer. The best vinegar is made from apples. Winter apples make the standard article. If summer apples are used, the cider must be concentrated at least one-fourth by boiling. Or the cider may be frozen, and two or three inches of surface ice be thrown away, or the vinegar may be drawn out and the ice left, or boiled cider may be added instead of freezing. Cider may be easily finished into vinegar in eight months. It can be hastened by being put into a standard barrel with one head out [cover with netting or cloth] and occasionally dipped into another. When finished, it should be corked tightly, and will improve with age. As the third-class apple is too small to be worked [peeled] by hand or machine, it follows that a cider-mill is a necessity to its economical disposition. This apple is ninety per cent. juice; why not feed the dry matter to the dairy cow's brother, as I did last year, mixed with corn chop, and then preserve the juice in one of four different ways? I think it more profitable than second-class apples sold to the canneries.

Professor Fowler says that fruit acids are necessary to the human system in order to maintain perfect health. Why not drink fruit acids as well as eat them? I don't mean at all times of the day, and between meals, or after fermentation. Fermented apple juice, or hard cider, is just as bad as fermented rye water or corn juice. Cider made from summer apples in August and September cannot be easily preserved, even with "keepers." It is best preserved by heating to 160 degrees and then canning or jugging it—glass or tin cans may be used, but jugs are cheaper. Fill the jug within one and one-half inches of the top; take a corn-cob that is too large for the hole in the jug and drive it in carefully with a hatchet.

This cider will keep sweet until used. If the space is large there will be a moldy cap on top, made by the shrinkage of the heated cider. This cider may be used the following spring or summer, when apples are gone, for drinking and cooking purposes.

To preserve cider in cooler weather, strain into an open barrel standing on end. Take salicylic acid two ounces, pure ground mustard two ounces; dissolve in one quart of hot water, mix well, and stir into the cider; then tie eight ounces of ground mustard into a cloth and suspend by a string, secured to the side of the barrel, into the cider; let stand ten days; then draw out carefully into small receptacles, fill them full, and cork tightly. Cider keeps best if vessels are full. I suppose cider may be preserved in hot weather by using enough salicylic acid. I have never tried it but once, and came so near being killed by the cork that came out of the keg that I never tried it again. Too much of the acid destroys the life and nutritious flavor of the juice. Apple juice may be concentrated one-half, then jugged or preserved by using a very little acid, without injuring its flavor, but when boiled to a fifth or a sixth is usually condemned as burned.

Preserved cider, simple or concentrated, may be used in a great variety of ways in cooking. Large amounts of it might be disposed of at bakeries if they only knew its economy and how to use it.

The Ben Davis apple ought always to be cooked in cider for sauce or pies. Crackers, bread or cake soaked in cider make as good apple pies as apples. If you want it a little concentrated add a little boiled cider or apple butter. Better lemon pies can be made with corn-starch, cider and lemon flavor than can be made with lemons; and so on with mince-pies, layer cake, plum pudding, etc.

Cull apples may be saved and conveniently stored in apple butter and cider jelly; but it does not find a very active market. It is very agreeable to the taste, but its concentration soon makes it "cloy" as a food. It is too strong for a weak stomach; but I believe with a second preparation just before using, making it weaker and more bulky, by the use of crackers or corn-starch, would make it more like the apple and more in accordance with the laws of health.

In my cellar at home are 200 glass cans and 100 jugs of Jonathan apple juice and 240 gallons of apple butter, besides the usual amount of cherries, peaches, blackberries, huckleberries, strawberries, etc., and about ten bushels of apples. The apple butter is for sale, but the other we will use before next August. If other families did likewise cull apples would bring more than good apples.

But let us take an economical view of this matter. Third-class apples are usually sold at ten cents per bushel. I have, however, bought second-class apples at five cents per bushel; but we will say ten cents. A bushel of Jonathan, Winesap or Rawle's Janet will usually make four gallons of cider; allowing $1\frac{1}{2}$ cents per gallon for making, gives us four gallons of apple juice for sixteen cents. A bushel of good apples in March is often worth one dollar, and after the hired girl has gone through them in her usual careful manner there is little more than one-half bushel left for pies. Now we will put up our twenty-five gallons of apple juice against this little pile of cut apples. Verily, apple juice is the poor man's medicine.

DISCUSSION.

G. W. MAFFET: I would not think of accepting ten cents per bushel for cull apples for any purpose. I would either grind them up for vinegar or feed them to hogs, supplemented with clover hay. I have grown some of the sweetest pork exclusively on rotten apples and Red clover that I ever tasted. You cannot pick apples up for five cents or seven and one-half cents per bushel, as is usually paid by the contractors. The gentleman talks about wholly green apples not making

good vinegar. If you will add sugar or sorghum it will make good vinegar. I do not feel like countenancing the use of salicylic acid, as it is injurious to the kidneys.

DR. G. BOHRER: I am anxious to know what to do with cider after it is manufactured. I can always sell vinegar at some price. I have been experimenting, and have adopted this plan: I pick up windfalls and grind them up and put the stuff into barrels and let the barrels lie in the sun; then about this time of the year [December] I draw off the cider or juice and put it away in the cellar or cave. Some I have already racked off the second time, and if racked off from time to time to time will make good vinegar. If handled for two years, so much the better. Put your unfermented cider into a barrel and rack it off. It may be as much as two years before that cider will become vinegar. In the meantime I would advise the man who is fond of hard cider to let it alone. There need be little waste in handling. To keep the hoops from rusting off the barrel, paint them. The old-fashioned barrel with hickory hoops would last better, but you cannot use iron hoops unless you paint them. Our folks boil down considerable cider and put it away every year. Boil about three barrels down into one. Our neighbors get it for mince-pies. It will keep for several years, and I cannot tell you what all it is used for. I do not think that salicylic acid, used in the small quantities recommended, will have any deleterious effect. But used in cider to ship, it sometimes explodes. I have a friend who corked it up in jugs in the cellar and all he had left was the jugs. You cannot confine it. Two ounces to the barrel, I think, would do no harm. Possibly four ounces would not. I have had little experience with it. Commercial cider, branded "Pure Apple Cider," is [often] not apple cider at all. As suggested, we need a pure-food law. Such things should be regulated by a statutory enactment. You do not know what you are buying. Cider is not good unless racked off.

A MEMBER: Do you use mustard?

DR. G. BOHRER: I never saw it used in a barrel of cider yet that it did not change the taste.

H. L. FERRIS: I do not recommend the use of much salicylic acid. I am shipping cider with two ounces of salicylic acid and two ounces of mustard to the barrel, and all has reached its destination safely. It was drawn off; that makes a difference. But heated and canned it will keep eternally, the same as fruit.

A. L. ENTSMINGER: I always destroy cull apples as completely as possible at least expense. After the apples are out of the orchard, by turning in the horses, cattle, and hogs, the insect larvæ are destroyed. I destroy every apple which falls to the ground; it don't pay to market them under ten cents per bushel, and you will gain more by destroying the apples on the ground than by spraying the trees.

MRS. G. W. MAFFET: Has any one here made cider jelly? I used to see it often in Ohio. I have tried to make it here, but was not successful.

C. D. MARTINDALE: In my old home in Ohio we had a factory. The apples were ground as for cider and [the juice] run immediately into the evaporator and out in jelly on the other side, without any sugar. The best flavored was made by using about half a bushel of quinces to twenty bushels of sweet apples; you would have called it quince jelly. It made the very best of jelly. In that way we worked up all our surplus; and I do not see why it cannot be done here.

R. DE GARMO: Seventeen or eighteen years ago there was a jelly factory at Oswego. They took any kind of apples, and with steam-pipes boiled the cider, and made barrels of jelly with no trouble. It was not necessary to put gelatine in it.

W. B. EAMES: We make jelly of all our apples not used otherwise. My wife takes Missouri Pippins and fixes them the same as for pies, leaving the peel on, and cooks them with a little sugar and makes nice jelly. In that way we do away with the poor, unsalable apples. I tell my boys that when the apples are ground up it includes worms and filth, and they could not be induced to taste cider.

MRS. A. CHANDLER: What is done with the jelly after it is made? How can the pure jelly enter into competition with what we find in the stores labeled "jelly;" I mean as to price?

A MEMBER: I make a jelly that can be cut with a knife. I core the apples, cook them, and put them through a colander and then through a cloth, and put in sugar as for any fruit jelly. For liquid apple jelly I put in a rose-geranium leaf, which gives it a fine flavor. I do not think we can compete with the cheap stuff on the market, yet I have been told by people who have eaten it at my house that it would sell at a good price.

J. L. WILLIAMS: Pure cider jelly is put on the market and sold to people who thin it and make a drink of it. They make half a dozen different kinds of drinks. This you cannot do with the glucose jelly. The factory at Oswego shipped many hundred barrels of it to the mountains.

WALTER WELLHOUSE: In making vinegar, it depends entirely upon the sugar. The sugar is broken up into carbon dioxide. The ordinary vinegar upon the market is usually from forty- to forty-five-grain strength. Early apples not containing much sugar will thoroughly ripen. The process is this: The sugar is broken up by fermentation into carbon dioxide and alcohol. The carbon dioxide escapes and leaves the alcohol. Some apples, of course, do not contain much sugar, and any apple to make the best vinegar must be thoroughly ripe and of a strength that will be changed into sugar; and the early apples that usually make vinegar are about thirty grains strong, but this is not strong enough. We have made from winter apples a twenty-three-grain vinegar in six months, and that was done by merely filling a barrel, with the bung-hole open, and turning it up on end and allowing it to stand in that way. Now, if the carbon dioxide lay on the top, the air cannot get to the vinegar. The carbon dioxide, being heavier than the air, would run out, but the alcohol must not be allowed to escape, as that is the strength of the vinegar. Of course, you can take it off after it has fermented and before the alcohol has formed acetic acid. It is not essential that the air should get to it.

A letter from Professor Stinson, and a paper on the Paris Exposition, by W. A. Taylor, were then read by the secretary.

MR. BARNES: We tried hard last fall to get fruit for an exhibition at Paris. We had about three barrels of the crop of '90, mostly from the south-central portion of the state. Our neighboring state, Missouri, had seventy-six barrels. With our three barrels we received third premium on fruit. We received word from Mr. Taylor that if we would ship not to exceed five barrels, he would be glad to receive them. We made the shipments. For the first shipment Mr. Richardson furnished two barrels; on the two shipments we succeeded in getting eight barrels. Those that went on the 12th of September received a gold-medal diploma, and those on the 26th of September took a gold-medal diploma, and together they subsequently took another gold-medal diploma. This means that we are entitled to the gold medals if we care to pay for them. Our friends from Missouri took a great many more premiums, but I think we were quite successful for what we exhibited there, and I like the idea of finding a new outlet for the productions of the United States.

J. W. ROBISON [lately returned from France]: Horticulture in France is prosecuted under very different conditions from those of the United States. To get at the foundation so that you may understand it plainly, the temperature in France is less variable, running from forty to fifty degrees. You would have to take off from our hottest weather from twenty to thirty degrees, and take off the same from our coldest weather, and add about two- and one-half times our rainfall. I spent nearly six weeks there during the latter end of the exposition and never saw a piece of ice, not even in butcher shops. Dressed meats hung for two weeks without taint. Along the road we saw the remnants of many orchards. They looked like they were planted twenty years ago and were trimmed up so that a horse could not reach the fruit; and I do not think they would try very hard, for about nine-tenths of the apples I saw were what we call cider apples here; and this year they were said to have the greatest crop of apples ever grown in France. They will all be gone quickly. That class of apples was selling very cheaply. In an orchard of 400 or 500 trees I saw not an apple larger than a Siberian crab. They were made into cider, and I think every empty barrel in France was this year filled with wine or cider. Empty barrels were in great demand. I never saw good cider come out of a new oak barrel. As they make that cider into wine they care nothing about that, because they have a method of changing the color. They are still making cider; when I left there last month (November) the ground was still covered with apples.

I saw no young, straight orchards, planted within fifteen or twenty years. There were no scabby trees; they do not believe in stunted trees—they use such for firewood. Nearly one-half of the country over which I traveled was covered with what they call a "forest." It is on hills too rocky to cultivate, even with a hoe; it is cut down every two or three years, so a "forest" is a brush patch. The most of this brush is made into brooms. I saw few brooms made of broom-corn. The brush that is too large for brooms is burned into charcoal and peddled over town and sold in little packages for a few centimes apiece. There was a contract made while I was there for 670,000 tons of coal, as an "experiment"—a poor quality—at seven dollars per ton laid down there.

There is no question but that the United States apple exhibit was a surprise to the world. They had never seen such apples, and they were surprised that they could cross the ocean in such good condition. The best I saw were from Utah.

They do not have as much fungoid growth in France as we have. The air is clear. They do not have the numerous injurious insects that we have. They would not propagate in that climate. They cannot grow a good crop of peaches out-of-doors. Not a peach grows there except on a wall or under glass. On a stand which I passed every day I saw some very fine Alexander peaches offered at seventy-five cents apiece. The wall peaches were all gone before I got there. A large room in Exposition hall was devoted to showing the methods of growing peaches. They searched from place to place to obtain a few specimens of apples. There were a few Twenty Ounce apples in the New York exhibit.

From the apples they grow there they make a very good quality of cider. They draw it off frequently and get all the sediment out of it. It is then clarified, and they do not think it fit to drink until it gets quite sharp and a little hard. Magnificent pears grow there in immense quantities—such pears as you rarely see here. A good pear was cheaper than a good apple in all of the markets. Grapes are grown to some extent. A few years since the grape and wine industry of France was nearly destroyed by the phylloxera, but great was my surprise when I was told that all grape-vines grown there now are grafted on a United States wild grape-vine root. Wild-grape cuttings from the United States have

made it possible for France, Spain and Italy to continue the grape-growing industry.

MAJ. F. HOLSINGER: A few years ago Leavenworth was headquarters for shipping wild-grape cuttings to France. Kansas has furnished roots for thousands of French grape-vines. They are cut eighteen inches long and tied in bundles.

J. W. ROBISON: People do not know the names of fruits there as we do here. It is a "red" apple, or a "yellow" apple; and in and about Paris they ask, "Will you take red grapes, or white grapes?" and that is the distinction by which they are known there. Paris was formerly surrounded by a wall. That wall is still maintained, and a duty is collected on everything that passes through its gates. The communes outside retaliate in kind, and everything that comes out pays a duty. This is a hindrance in taking our apples in. Every barrel would have to pay duty in passing through these gates.

A. CHANDLER: Tell us the cost of shipping a barrel of apples into France?

J. W. ROBISON: The ocean freight is very cheap. The great cost would be in duties paid, and I do not know just what those amount to. As I said, the pears are very fine. I saw trees growing outside on the wall. My interpreter called them "wall pears." These trees grow three feet in diameter and produce a little sour pear, from which they make the best champagne. I saw a lot of log-wood piled up, which was used to color wine. Near by I saw 1500 barrels of apple cores and peelings to be made into wine. There was quite a furore in Paris when it was discovered that one of the largest wine makers, an alderman, was making this wine inside Paris. He could make a barrel of it cheaper inside than he could get it through the gates. I took a ride through the country to see what was growing. Much of the country was in grain. It was much like western Kansas in soil and atmosphere. The wheat was fine in quality. They also raise beets. I counted from the train at one time seven beet-sugar factories. All around Paris are market-gardens—lettuce, cabbage, and kale—which pay seventy-five dollars annual rent for their land, and put twenty-five dollars more in fertilizers; but farther from Paris rent is lower, being forty dollars per acre, and put on from ten dollars to twenty dollars in fertilizers. The grain land that I referred to was worth only about half as much. Good draft-horses in Paris cost from \$300 to \$375; poor ones in proportion. Potatoes are very small and are preferred thus, especially by restaurant keepers. They say a man will eat a small potato clean, while he will leave a part of a large one to be wasted. Canada had apples on exhibition of the years 1898, 1899 and 1900 at the exposition. These were taken from cold storage. Austria and Russia had a supply. The United States had canned and dried fruit brought regularly to keep up its display.

A MEMBER: Did you see any strawberries while there?

J. W. ROBISON: Yes. They told me they had been bearing for about six weeks then; and I never saw finer blackberries than they grew. They were used exclusively for making wine. The main shade-tree is the horse-chestnut. Next to it is the sycamore. It grows full of balls, and in consequence is very beautiful. Paris is a town kept for visitors. The world visits there, spending money and seeking pleasure. If the visitors' money was taken from Paris it is alleged that there would be a panic in thirty days. It is estimated that there are from one to one and one-half millions of visitors in Paris all the time, and they spend an average of five dollars to six dollars per day while there.

SECOND DAY—MORNING SESSION.

DECEMBER 28, 1900.

Meeting called to order by President Wellhouse.

Opening prayer by Rev. D. M. Fisk.

PRESIDENT WELLHOUSE: The first thing is officers' reports. The president has little to report. Fruit-growing in Kansas never looked brighter than to-day. At no time in our history has there been such a demand for fruit and fruit-trees. In talking with nurserymen, I find the whole state is inquiring for fruit-trees, and all reports show the increase in tree planting to be growing. While we do not claim all this is owing to the work of this Society, yet we know that it has a good deal of influence in the planting of the right kind of fruit-trees; and all the report that I can give is that the Society is growing, the fruit-trees are growing, and their number is growing.

SECRETARY BARNES'S REPORT.

The work and influence of the Society have progressed very favorably during the past year. Besides the innumerable questions answered there have been several issues of literature. First, the Twenty-fourth Annual Report. This report, confined by false economy to 100 pages, was issued March 1. "The Peach," a companion to "The Apple," of last year, was distributed as freely as the small edition would allow, and hundreds of refusal letters were sent in reply to requests for either or both. We have been compelled to be very conservative in the distribution of these works, owing to the wonderful spread of a desire for knowledge along these lines and the smallness of the edition allowed. "The Plum," a third work of this series, was issued about September 1, and the indorsements of each are flattering. "The Cherry" is now before you and will be useful for spring information. "The Grape," the next of the series, is being compiled, and it is hoped that much new and valuable material for the same may be obtained at this meeting. This series of works should be continued until general horticultural subjects are exhausted, and then revised and issued again. There can be no doubt but that the coming decade will see our rural population vastly increased, and this surely means smaller holdings, and smaller holdings always result in an advance of horticultural pursuits.

The general printing fund is drawn upon for every department of the state, and while the printing committee may personally and collectively favor agriculture and horticulture, yet they, as guardians of the state fund, must be impartial; therefore, some *legislative action* should be had favoring larger and better bound editions of our bulletins and for taking the limit from our report. In the legislature of 1899 a bill to increase the size and edition of the report was favored by a majority in the house, but was without a champion to push it, and was left by the time-limit agreement between the houses. Our neighboring states send substantially bound annual reports to this office, of the following sizes: Missouri, 480 pages; Nebraska, 295 pages; Michigan, 448 pages; Iowa, 593 pages; Minnesota, 516 pages; Illinois 448 pages, etc.

The edition of our report (now made a biennial) is only 3000 copies—not half enough for our own people; yet the interests outside of the state in our affairs require several hundred of these. The newspapers of our state require 700 copies; the historical society receives by law 60 copies; leaving, practically, less than 2000 copies for distribution. There are 40 local societies, besides the State Society, and these ought to receive at least 40 copies each—1600 copies—leaving few for scat-

tered yet interested seekers after horticultural information. Our report should be annual and unlimited, but 350 pages would be ample, and the edition should be at least 5000 copies.

The work of the Society needs these aids. While the Society meets only once each year, and the secretary cannot travel all the time, the books can, all over the state, at all times, be useful to those who obtain them. The carriage of the reports and the several handbooks requires so much postage and expressage that we find our appropriation for these purposes too small. We were compelled, before July 1, to demand postage from many correspondents before sending the work desired. We were also compelled, at one time, to call upon the historical society for copies of a late report which was exhausted. We constantly refuse to send reports in bulk to members of the legislature for distribution, as, from the size of the edition, they would quickly be exhausted by such liberality. Besides the above issues, we sent forth a mapped report of the apple conditions in July and a circular on the Pan-American Exposition.

As most of you are aware, six years ago the Society decided to move its office from a farmhouse three miles west of Lawrence to the state capitol, and the date of the change, June 30, 1895, found us with a tiny desk, a chair, and a few volumes of reports, all by courtesy in a corner of the office of the then labor commissioner in the capitol. From this small beginning, often in the face of grave objections, the Society moved, first into two small rooms on this (ground) floor, and finally, on August 29, 1898, into this room, afterward adding two small rooms on the north. These rooms should be suitably prepared and liberally furnished at the earliest practical moment. The furnishings should comprise all necessary office conveniences and an educational display along all horticultural lines, such as preserved and imitation fruits; preserved and pictured insects in their various stages; models of horticultural implements and inventions; maps, drawings, photographs and other pictures, with necessary cabinets, cases, frames, etc., for preserving such collections.

The year 1900 has been a good fruit year. Our state has brought forth a large crop of fruit; no variety was an entire failure. The strawberry crop was immense, other berries better than usual, and, barring the effects of the weather of two years ago, the crop of cherries, plums and peaches was excellent. As is always the case, some localities report failure, some partial success, others abundant success. Apples were in numbers a fair crop, but of inferior size. Ravages of insects, and a lack of tree vigor caused many to fall, and also caused the crop of good fruit to shrink in proportions. Opinions differ as to the total output. This reminds us of the importance to the Society of gathered statistics; the statutes give authority to the agricultural board by which they receive regular information in regard to agricultural products, said information coming monthly, provision being made for rewarding the informants. The assessors being compelled by law to gather certain statistics which are aggregated by the county clerks and such aggregates forwarded to the department. On the blanks used there is little pertaining to horticulture; a simple statement of the number of fruit-trees.

The duties of the agricultural department are great, but would not be injured in any way if the horticultural statistics were gathered on blanks of its own and the results compiled in this office. Such work would place this Society in direct communication with the horticulturists of the state, and give to citizens and the world greatly needed and valuable information. At present we have no means of even guessing at the quantity of fruit grown or of the localities in which the

different varieties are most successful. Our apples have taken several prizes at the Paris Exposition: The fruit of 1899, in May; fruit of 1900, in October.

The time has about arrived when passive submission to untoward conditions and unfavorable legislation detrimental to horticultural progress should cease, and aggression of the most vigorous sort be indulged in. The two great drawbacks to horticulture in our state are drought and insect pests. Long enough these have been called visitations of providence; and a calm resignation or supine indifference has allowed these two great forces to conquer a large part of the results of our labor. This should not continue. Horticulturists must awake with vigor and determination, and get into energetic action to remove, overcome or modify both.

Drought can only be conquered by water. Rain-making has not yet proven a success, and the rain-maker, if he ever was successful, seems to have lost his hold and gone glimmering. Yet the necessary moisture required must come from the clouds. Of this natural rain much runs to waste, and such waste floods the lowlands, breaking dikes and levees, and is always a menace to, and often a destroyer of, human life. A tragedy not uncommon is to see the weary and discouraged farmer, praying for rain, suddenly overwhelmed—with the crops cared for by his toil—in a rush of water from a broken levee, the result of floods developed in the far away cañons and needed all along the route by thirsty farms on its margin.

Irrigation is of national importance; millions of fertile acres of our country, which, in time will be settled by our ever-increasing population, must be irrigated to be useful. The *nation* should "save the forests and store the floods." These problems are so immense and of such grave importance that individual, or even associated individual effort, must have little effect and become arbitrary and narrow in the distribution. With the national aid should also come state co-operation, to harmoniously regulate interstate river claims and water rights.

The ninth annual session of the National Irrigation Congress, which met last month in Chicago, believed it feasible and right that the national government should build the reservoirs and main canals for storing flood waters, but that it should have no voice in the distribution of such water. They passed the following resolution:

"We hail with satisfaction the fact that both of the great political parties in the last campaign declared in favor of the reclamation of arid America, in order that settlers might build homes on the public domain, and to that end we urge upon congress that national appropriations commensurate with the magnitude of the problem should be made for the preservation of the forest and the reforestation of denuded acres as natural storage reservoirs, and for the construction by the national government, as the part of its policy of internal improvement, of storage reservoirs and other works for flood protection, and to save for us in aid of navigation and irrigation the water which now runs to waste, and for the development of artesian and subterranean sources of water-supply.

"The water of all streams should forever remain subject to public control, and the right to the use of water for irrigation should inhere in the land irrigated, and beneficial use be the basis, the measure and the limit of the right.

"We commend the efficient work of the various bureaus of the national government in the investigation of the physical and legal problems and other conditions relating to irrigation, and in promoting the adoption of more effective laws, customs and methods of irrigated agriculture, and urge upon congress the necessity of providing liberal appropriations for this important work.

"The work of building reservoirs necessary to store the floods should be done directly by the government, under existing statutes relating to the employment of labor and hours of work, and under laws that will give to all American citizens a free and equal opportunity to get, first, employment and then a home on the land."

A large committee went immediately to Washington to present the matter to the president. Vice-president elect Roosevelt and General Miles both indorsed the project by autograph letters read before the congress.

Now, if this one great drawback can be thus provided for, why cannot the other, namely, insect pests, be similarly guarded against, controlled, or destroyed? Our national board of agriculture is striving to prevent the importation of noxious insects (would that it might have begun this work many years sooner). Many states have passed stringent laws regulating this matter; but Kansas, usually near the advance line, has no law on her statute-books on this important subject, and but few laws protecting the interests of horticulture.

Late in the session of the legislature of 1899 a bill creating a state entomological board was prepared by Professor Hunter, of the Kansas University, and introduced, but did not pass. I thoroughly believe that a similar bill should be passed, and, as the majority of the noxious insects are peculiarly detrimental and disastrous to horticulture, I believe this should be the office of information, and the secretary of horticulture should be a part of any state entomological board or commission. I hope this body will favor such legislation. Here is a copy of the bill:

AN ACT to promote and protect the horticultural and agricultural interests of the state by creating a state entomological board.

Be it enacted by the Legislature of the State of Kansas:

SECTION 1. There is hereby created a state entomological board, which board shall consist of the associate professor of entomology of the University of Kansas, the acting professor of entomology of the Kansas State Agricultural College, and the secretary of the Kansas State Horticultural Society. The members of this board shall be designated as state entomologists, and shall serve upon this board without remuneration other than that each may receive as occupant of said professorship or secretary of horticulture. The said board shall meet on the third Tuesday of March in each year, and organize by the election of a chairman, who shall hold such office until the succeeding annual meeting.

SEC. 2. Whenever it shall be known to any member of this board that there exists in any locality of the state an insect seriously pernicious to the horticultural or agricultural interests of the state he shall report the matter to the chairman of said board, and said chairman shall personally inspect premises reported as infested or request the other entomologist of said board to inspect said premises. After inspection, the owner, his tenant, or agent, shall be informed in writing of the findings, and be notified to proceed at once to destroy such insects, larvæ, or eggs; he shall also be informed as to the most appropriate methods of doing it, and shall be allowed a reasonable time, not to exceed one week, in which to begin such work of eradication.

SEC. 3. If, after due notice, instruction, and time, the owner or agent shall fail to comply with such notice, any member of said board is hereby empowered to enter upon such infested premises, and use such means and employ such assistance as will insure the thorough eradication of any noxious insects, larvæ, or insect eggs.

SEC. 4. In case of objection by said owner, his agent or tenant, to the findings or procedure of the state entomologist conducting the inspection, an appeal shall be taken to the board of county commissioners of the county wherein infested premises are situated, and their decision shall be final. Such appeal must be taken within three days, and shall act as a stay of proceedings until it is heard and decided.

SEC. 5. The expenses attached to the inspection of infested or supposedly infested localities, together with material employed in destroying pernicious insects, shall be met by the board of county commissioners of the county in which said premises are located, and said board of county commissioners shall pay said expense, upon presentation of an itemized statement by the state entomologist conducting the work, out of any funds not otherwise appropriated. In case it is deemed expedient to destroy infested plants or trees, no indemnity shall be allowed for such plants.

SEC. 6. In case any person or persons interfere with the members of the state

entomological board in the performance of its duties, or fail or refuse to execute the directions of the said board of county commissioners after an appeal, the said person or persons shall be deemed guilty of a misdemeanor, and shall be fined in any sum not exceeding \$100. It shall be the duty of the county attorney of the several counties of the state to enforce the provisions of this section.

SEC. 7. Whenever a resident nurseryman desires his trees, scions and all such stock as is commonly known as nursery stock inspected for pernicious insects, he shall communicate his wishes to the chairman of the said board, and said chairman shall arrange with one of the members of said board for the inspection of said nursery stock or said chairman shall personally inspect said stock. The time of inspection shall be arranged at a date convenient for said nurserymen and state entomologist conducting the inspection. If, after careful examination, said state entomologist finds no insects pernicious to said stock, either upon said stock or upon premises whereon said stock is located, he shall, upon payment of expenses incurred by said inspection, issue a certificate of inspection to that effect, such certificate to be attested and recorded by the secretary at the office in the state capitol.

SEC. 8. In all cases the inspecting entomologist shall furnish to the secretary a full and complete report, showing the kind of insects, eggs or larvæ found, the section and township where found, the extent of its depredations and spread, the means taken for eradication, and the quantity and size of the trees or plants destroyed by him, and the expense incurred; all of which data, together with the day and date, shall be carefully recorded by the secretary in a book kept for the purpose in the office at the state capitol.

SEC. 9. All acts inconsistent with this act are hereby repealed.

The above bill was introduced on first day, and was still on the calendar at the close.

Local Horticultural Societies.—Here is the great point wherein we lack. There are forty in the state; there should be 400; and if there were 400 live local horticultural societies in our state, Kansas would be the garden of the world. The memberships run from 10 up to 170 to a society. Many of our counties should have three or four large, working societies within their borders. If they had, fake nurseries would stand no show; insect pests would be practically obliterated; every farm home would have its table supplied with the goodly products of the soil; importations of indigenous fruits would be rare; our canneries would be working on full time and full supplies; and our exportations of home-grown horticultural products would be very large, and Kansas fruits would rival California fruits in the markets of the world.

Why do we import potatoes, onions, cabbage, berries, apples, plums, cherries, peaches, water- and muskmelons during the season when our own are being harvested and should have precedence in the markets of our state? The main reason, I believe, is the lack of association and combination for educational, practical and financial benefits—a lack of horticultural cooperation.

While workers in all lines of manufacture, mechanics or mining will, on call, take a day off to learn more of their chosen occupation, the state of the market, and future possibilities and probabilities, the horticulturist claims and believes that he is too busy and "cannot spare time." We truly believe that if the strenuous worker will take one day in each month off, consulting with his co-workers, he would, by added knowledge, so facilitate and felicitate his labors as that he could and would accomplish more than his stay-at-home, plodding neighbor. I find our most successful, intelligent and practical horticulturists are the leaders and pushers in the nearest local horticultural society. I hope each member here present will go home fully determined that there shall be in his locality a live, up-to-date horticultural society, if he has any power or influence.

Historical.—At no time in its thirty years of history has the State Horticultural Society been so well equipped and prepared for work as at present, nor on

so intimate a footing with sister states and Canada. Our membership, especially the life memberships, have rapidly increased since July 1, 1895. Under the old administration, for twenty-six years, up till June 30, 1895, sixty-one certificates of life membership were issued. Of these, twenty were for cash and forty-one for services. Obligations unsettled at change of administration required the issue of ten more for services, making fifty-one issued for services.

Since July 1, 1895, fifty life certificates have been issued for full pay, and one for services.

Of the "old guard," including the organizers, seventeen have passed into the hereafter; eight have left the state, and quite a number are not in communication with the Society.*

The history of horticulture in our state will some day be written, but it will never be possible to truly show how great a work this Society has performed, nor its influences on the lives and happiness of our citizens. Kansas owes a heavy debt to the horticulturists who disinterestedly publish the results of lifelong experience and labor, costing tens of thousands of dollars and much tribulation. The result attained at home, the gold and silver medals, diplomas and encomiums received abroad, verify our state motto.

As in our civilization, our education, our self-culture, and our agriculture, so in our horticulture, we pass "thro' tribulation to the stars."

PRESIDENT WELLHOUSE: The subject of small fruits will now be taken up. Mr. Kenoyer is first on the program.

F. L. KENOYER: Please bear in mind that I am reporting my own section only.

SMALL FRUITS.

By F. L. KENOYER, Independence.

In southeastern Kansas, the autumn drought of 1899 proved fatal to red raspberry canes and destroyed many strawberry plantations. On my farm, strawberries made about a half stand of fine, stocky plants. Kansas raspberries, Lucretia dewberries and Early Harvest, Kittatinny and Kenoyer blackberries, the only tested varieties of the raspberry and blackberry that have proven a success in my locality, all passed through the drought uninjured and made a heavy growth of canes. All varieties of berry plants, *where properly cared for*, passed through the winter in perfect condition. The past season has been, all things considered, the best in the last ten years for the growing, ripening, harvesting and marketing of small fruits.

Almost all varieties of strawberries bore a heavy crop of fine berries, the only exceptions coming under my notice being the Marshall and Belt. These varieties blighted. I have discarded them, as they did not pay expenses. My most profitable varieties were Parker Earle and Brandywine. These produced the greatest number of strictly fancy berries, which are always the money-makers in the home market. The Clyde bore one or two pickings of enormous berries, the remainder of the crop drying on the vines before maturing. The old Miner's Prolific, owing to its superior quality for table use and ability to stand severe drought and total neglect, is grown more extensively in my section than any other variety. About half of its berries grade "fancy." The Gandy bore a good crop of large berries, but it is not productive on all soils. Many other varieties, such as Bederwood, Warfield, Haverland, Tennessee, etc., were very satisfactory in yield, but the berries grade too small for top of the market.

*W. S. Coley, of Oswego, Labette county, died since above was written, viz., May 10, 1901. He was for two years a trustee, and for many years an active member of this Society, and a leading practical horticulturist of Labette county.

The Kansas raspberry bore an abundance of extra-fine berries. We grow no other blackcaps for market. All varieties of red raspberry succumbed to the autumn drought.

Lucretia dewberry bore a heavy crop of very large berries, and promises to be most profitable. It should be planted extensively.

Early Harvest and Kittatinny are the only varieties of blackberries cultivated to any considerable extent in my locality. They each bore a full crop. You must remember that southern Kansas has a full month more of hot, summer sunshine and drying winds than northern Kansas; consequently, varieties that thrive the best here in the north are often worthless in the south. There the Snyder blackberry usually "goes to seed"; the Erie berries turn red and hard, instead of black and juicy; the Lawton, when it should be ripe and sweet, is sour enough to make a pig squeal; the canes of Stone's Hardy, ere they have seen the first frosts of winter, are as dead as a stone, and are as hard, if not as hardy; and so on down the list. While not all varieties that pay in the north are a success there, I have yet to see a variety of small fruit that succeeds there and does not succeed equally as well in the north. Within the past few years what seems to me to be as nearly perfect a blackberry as yet produced has come under my observation. [Here Mr. Kenoyer gave a brief history and description of this new berry.]

The market prices of berries last summer, except blackberries, were higher than for several years past. Strawberries averaged \$1.75 per crate for fancy, \$1.25 for ordinary berries; blackberries, \$1 for Early Harvest, \$1.30 for Kittatinny; dewberries, \$1.50; raspberries, \$3. I sell nearly all my berries in the home market. I consider a well-worked home market worth twice as much as a good shipping market. I have my berries carefully grown, carefully picked, carefully graded, carefully handled, and, as far as possible, sold direct to consumers. I put all first-grade berries in boxes differing from all other boxes in the home market and with a rubber stamp label each box "Sunny Slope Fancy Fruit, Grown by F. L. Kenoyer."

Last year I used stamped Leslie boxes for fancy berries. In a few days after marketing them, some of the boxes would reappear in the grocers' windows refilled with scrawny, knotty berries, labeled "Fancy Fruit, Grown by F. L. Kenoyer." This year I used the X. L. box, made at St. Joseph, Mo. It is the most attractive box made. Unscrupulous growers did not gather up these boxes for refilling, as they did not fit their crates. I never fill stamped boxes with inferior berries. The stamp is a guarantee of the quality of the berries.

In the third district the average set to small fruits last spring was increased probably twenty-five per cent. over the previous year. The season was favorable throughout for plant growth, and the present outlook is favorable for our welcoming in the twentieth century with the best small-fruit crop on record.

REPORT ON SMALL FRUITS.

By H. E. GOODELL, Tecumseh.

Strawberries in new beds came through the winter in good condition. Old beds were badly killed out. First blossoms appeared about April 12, on the Clyde, Bederwood, Captain Jack and Warfield following closely.

Have not found any better way of planting than the spade method. Set three patches without removing the dirt from the roots of plants. Was disappointed with results obtained thereby. Find it pays big to have the ground in best possible condition before putting out plants; and light cultivation should follow *at once* after setting of plants.

We marketed our first strawberries the 17th of May, from Warfield and Captain Jack varieties. The Clyde would head the list, but as I sold out so closely on plants I was able to fruit but very few of the Clyde. The Captain Jack and Warfield did exceptionally well with us this year. The first few pickings were below par on account of excessive rain, followed by hot, dry weather. Our picking season was of about three weeks' duration, and on the whole very satisfactory.

Am unable to give estimate of yield, as every row of my new patch was dug into for plants. Our average price was \$1.50 per crate for the entire crop. The Clyde is a very promising berry. The few plants I had were well loaded with nice berries.

The Bubach was an entire failure with us this year. The Gandy gave a very light crop. Parker Earle, Shuckless and Ironclad gave fair crops. The Splendid, Staples, Lovett and Glen Mary stood the hot, dry summer months remarkably well. Have not fruited the latter varieties as yet, but they have made a fine plant growth.

Finished setting two acres of strawberries the 5th of November that are in fine condition at this time, the last set looking better than the first, on account of weather being more favorable. Have set some as late as the 20th of this month (December).

The most of our berries are under prairie-hay mulch at this time and in good growing condition, without any frost in the ground. Have not found anything as good for mulching as prairie hay, clear from noxious weed seeds. Good clean straw would be next choice.

Our experience with the Parker Earle differs somewhat from reports made last year as to them being susceptible to cold. Two years ago last October (about the 20th) we set 7000 Parker Earle. Failed to get a part of them mulched, but notwithstanding they went through the winter O. K. Last winter had a small patch of Parker Earle in a low place, where, after a thaw, they were covered with water, which froze solid and remained so for about ten days. I supposed they were gone sure, but, on the contrary, they came through nicely and yielded a fair crop of berries this year. Our trouble with them is that they blight badly when the crop is about half matured. Not quite so bad where under irrigation. Before leaving the strawberry, I will note the experience of a neighbor which came under my observation. Two years last spring, for the sake of economy, he selected fifty nice Warfield plants that failed to blossom; these were put in plant bed the following year; three patches were set in different locations, all of which made good plant growth, but were failures in the way of fruit this year, when they should have produced a full crop.

Raspberries were pretty badly killed out in this locality. Ours gave about half a crop, the Kansas doing the best.

I know of one man who is making a success of the Kansas raspberry; is getting full crops every year, of fine berries. They are planted on river bottom on the north side of timber, giving them a windbreak on the south.

Blackberries gave us a good crop this year. Early Harvest, Eva, Snyder and Kittatinny doing the best.

DISCUSSION.

J. L. BUTLER: Parker Earle strawberry blights badly; I think it requires rich ground and plenty of fertilizer to grow a good crop every year, but it does not stand the winter. It produces a large plant and stays in fruiting four weeks. I make more money off Parker Earle than any variety I ever planted.

A. L. ENTSMINGER: I tried Parker Earle two years ago, and found it bore too much fruit and would not stand drought. It will stand the cold better. I raised

it on rich bottom land, and think it a variety that will suit some localities and not others.

F. W. DIXON: I grow a few strawberries, and find the Gandy is the best. It is of fine flavor and people are just finding out its value, as the demand for plants is increasing. The best plants we have are Stayman. After the first picking the berries are very firm and fine for shipping. The Bubach stands the test for good berries. Bisel is also a good variety.

A. MEMBER: Is the Aroma a good plant producer?

F. W. DIXON: Not as good as Gandy. Another new berry, originated in Arkansas, is the Bush Cluster. It is something phenomenal, and is certainly one of the best introductions in the strawberry line. The Provident Queen has been having a "puff" from Illinois. One of the best pollenizers for Warfield is Staple. The berry is a little too dark, but it is a good pollenizer for the Warfield, which is one of our best varieties; it makes a good berry. During drought the plants become small. Bismarck succeeds in some places, but after about the third picking it gets quite small. An observation I wish to mention is, that if we pollinize Bisel with Bismarck the berries come perfect, while those pollinized with Captain Jack were a failure. Captain Jack was an absolute failure this year. One of our earliest berries is Excelsior, though we have another claimed to be earlier. I suppose that after awhile we will have them [ripe] by the time the frost is out of the ground. Johnson's Early makes good plants. Segert is better than Bubach. Parker Earle requires a light soil, with plenty of fertilizer. Sometimes it bears freely, sometimes not. The plants have winter-killed with me two or three times. Windsor Chief, a late berry, always does well. Sandy still maintains its record as the best late berry. Raspberries are not profitable with us. For two years they have been almost a failure. We try to maintain late cultivation. I believe that if we continue cultivation late during a dry fall the raspberry will stand it better.

A. MEMBER: Tell us how you cultivate after they commence to ripen?

F. W. DIXON: That is just what we cannot do. There is only one that does stand the racket, and it beats Mr. Griesa's Cardinal raspberry. Of blackberries, the new El Dorado is one of the best. It does not seem to be overproductive. The Snyder seems to be overproductive. We had a good crop this year. The Kittatinny was the very best we had on the place. A number of other blackberries made fine growths.

A. L. ENTSMINGER: How about Lucretia?

F. W. DIXON: The canes of Lucretia will not stand the winter unless covered. There is always something new coming up that does not perform as well as the gentleman introducing them says they will.

R. DE GARMO: I have been listening to Mr. Dixon. I intend ordering some Nick Ohmer plants from him, and I see he says nothing about them.

F. W. DIXON: Nick Ohmer is a complete failure with us. This year it did fairly well, but whenever we have anything that is a complete failure in fruit growth we discard it. Nick Ohmer produces plants and nothing else.

J. W. GREEN: I would like to ask Mr. Kenoyer how he *knows* the parentage of his blackberry? He tells us it is a cross between Early Harvest and Kittatinny. The only blackberry on my place is the Early Harvest. What I would like to know is if Mr. Kenoyer knows this is the parentage, and whether it is a deliberate cross or merely a happening?

F. L. KENOYER: In regard to knowing the parentage of a plant that has not been cross-fertilized by hand, I know that there were only Early Harvest and Kittatinny growing on my place, and no others within miles of it; so I inferred

that it was a cross between them. The canes cannot be distinguished from Early Harvest, but the berry is distinctly of the Kittatinny type, and not like Early Harvest. Those on exhibition have been shrunken by preservatives and do not show the true size of the berry. Our president and secretary have both seen the berry. I sent some in June—their ripening time—and an explanation from them might be in order.

SECRETARY BARNES: The berries now on exhibition, together with a box of the berries, were sent me at the time they were ripening. I found them to be entirely different in flavor from Early Harvest. Mr. Kenoyer has a letter from me that I wrote him at the time, denoting their points that I discovered then. The berry has a good, true blackberry flavor. I could probably have found better specimens had I been in his patch. You will see that it is a very fine appearing berry. [Preserved on the cane in glass jar.]

SECOND DAY—AFTERNOON SESSION.

DECEMBER 28, 1900.

AUDITING COMMITTEE'S REPORT.

MR. PRESIDENT: We have examined the accounts and vouchers of the treasurer and find all correct. We have also examined the secretary's report, showing the amount appropriated by the legislature, the amount drawn, and the amount on hand. We find this report correct.

B. F. VAN ORSDOL,
J. C. BECKLEY,
H. E. GOODELL,

Committee.

The report was adopted.

DISCUSSION, CONTINUED.

G. W. MAFFET: I have tried sixty-five varieties of new strawberries at one time. I have been trying for years to get something better than Parker Earle for a staminate and Warfield for pistillate. Warfield is undoubtedly the best for shipping, and Parker Earle next. At one time I was afraid to use Parker Earle as a pollenizer, but, after experimenting, I am satisfied that Parker Earle is a safe pollenizer for the Warfield. It is inspiring to see the fruit around Parker Earle. The only objection to it is that it makes few plants. As an experiment I used Parker Earle to pollinize twenty-four different varieties. I now have seedlings from Parker Earle and these various pistillate varieties. I am going to describe these berries which I am experimenting with. I have many different varieties. I want something later by about two weeks than Gandy. We all do. We want more plants than the Warfield makes—of course we do—with foliage about as large as pie-plant. We want double the yield, and each single berry as large as a hen's egg. Now, should we not grow enthusiastic over [twentieth century] new fruits? There is a legitimate pride in originating new fruit. David Harum says "farming all day and choring at night." In fruit-growing a man never get any slack time. The man that originates a new fruit should make money by it.

BEST HORTICULTURAL IMPLEMENTS.

By J. L. WILLIAMS, Kansas City.

In traveling over the state during the last year we have visited many fruit-growers and gardeners, and find a large variety of implements in use, many of which are antiquated and out of date, and, after much thought, inquiry, and inspection, we find but few practically adapted to our needs. In implements for the preparation of the soil for planting, the last century has been one of advance-

ment in all lines. Compare the present implements with those used twenty-five years ago. In this report it is utterly impossible to give the particular features of any one make of goods, but we suggest that, if any member is interested, a letter properly addressed to any of the manufacturers or their agents will bring the needed information, and they will take time and pains in explaining the merits of their several lines of goods.

In preparing the soil for seeding, we find the hand and sulky plows manufactured by the Morrison Manufacturing Company, of Fort Madison, Iowa, possess valuable features over others. When it comes to harrows, there is no end to variety and style. The principal harrow recommended is the lever harrow, in a steel frame; in this style there are six or seven dozen, all made practically alike. The Morrison Manufacturing Company seem to be the only one who have made any radical improvement in this style of harrow, which improvement is a valuable one.

This company also makes a line of beet cultivators, pullers, and planters, and an orchard cultivator for working under apple trees while the team walks out and clear away from the tree. They also make the Keystone weeder, for strawberries and garden-truck of all kinds. After diligent inquiry and search, we failed to find the above-mentioned tools in the line of any other manufacturer. Should you desire to look the matter up yourselves, address your inquiries to Messrs. Buford & George, Kansas City, Mo., general agents, who will carefully furnish desired information.

In looking up the single- and double-shovel plows and five-tooth cultivators, our conclusion was that the Brown, made at Zanesville, Ohio, leads all others, owing to the peculiar form of the shovels and their manner of adjustment.

In the preparation of the ground for seeding, we should not overlook the roller. The old-fashioned field roller was all right in its day, but the new, up-to-date steel roller, with its large drum, which makes it draw much easier, is harder and more effective.

We found only two lines of seeders, drills, and planters. First, the Planet Jr., a very complete line of drills, planters, one-man cultivators, and weeders, all of which have attachments by which almost any kind of work can be done in any ground. An instrument that particularly struck our fancy was the Bradley combined seed-drill, planter, cultivator, weeder, and hiller. This instrument is fitted with a marker and attachments, so that you can drill in rows or drop in hills in rows, cultivate, weed or hill at your pleasure, all with the one and same tool. Another cultivator that is worthy of mention is the "Easy," of peculiar construction, and particularly adapted to our use. It also has attachments as in both the others. All these are exclusively hand-power tools, no horse being used, one man only operating them successfully.

We came across the new Aspinwall potato-planter, which drops and plants the same as a corn-planter. This is a handy implement, and one that will save potato growers much hard work.

DISCUSSION.

A MEMBER: I would like to ask if you ever used the plow you speak of?

MR. WHITEKER: It is Clark's California cutaway, reversible plow. A. Mendenhall, Kinmundy, Ill., has the agency.

MAJOR HOLSINGER: There were some of those implements in Wichita. I was told I could get them there.

MR. ROBISON: I would like to ask wherein is the advantage in cutting away? I presume the same principle applies in that as does in all of the disk harrows. I surely never would buy a cutaway. It might be compared with a plow that cuts

a few inches and jumps a few inches. We are using the solid disk. It opens the furrow, kills the weeds, and I do not believe it would be expedient to substitute a cutaway for it.

A MEMBER: Do you have trouble in the cutaway disk bending?

MR. ROBISON: Yes, I have had them bend; but the greatest trouble is that it does not cut clean.

DR. G. BOHRER: After the trees are first set out, I find nothing better than a one-horse plow. Use it yourself. Do not cut the roots, but, after the trees are of some size, a disk harrow is certainly all right.

J. W. ROBISON: I do not like the disk. It is a horse killer. The disk harrow is good after the trees get some size, and after that the Acme harrow is the very best. It crushes clods and keeps the surface level. I have a cherry orchard as clean as this floor is now and I used nothing but an Acme harrow. It is not intended to plow with or destroy any but small weeds. You have got to use it when the weeds are *very* small. I know of no implement yet invented which will go between my trees now. They are thirty feet apart and the limbs meet. I do not know that it would do them any good now. The varieties in my apple orchard are Ben Davis and Smith's Cider. I have found the Diamond plow a good tool to use.

G. W. MAFFET: It seems that a good tool is not well understood by the members. In working among young trees we heap them up. Is there anything that will work the soil away and back to the tree again? The improved disk harrow as is used in orchards now has two levers. The ordinary disk harrow will work away from the tree and, reversing, it will work back. The orchard disk harrow as now made has an adjuster. It is an ordinary disk until you screw on two frames, and when that is done one guard or disk is ten or twelve feet and the other five or six feet from the tree. You can bring the disk towards the tree or turn it away, as you please. Anybody knows if you get it down to three disks on the gang an ordinary team can swing it to advantage in any orchard.

GEO. A. BLAIR: I have a disk such as he describes; manufactured, I think, by the Johnson Hardware Manufacturing Company. When you place those frames on, it works eleven feet from outside to outside. It has a three-horse doubletree. It takes pretty good horses, and I do not believe two ordinary horses could do very good work with it. You change the action from or to the trees by changing the gang disk from this side to the other.

J. W. ROBISON: The number of the disks and the depth is under the operator's control. The more slant you give it, the deeper it goes; the sharper it is, the cleaner cut it makes. If you want to work faster than three disks on a side, put on six disks and six horses. We double the work of one man by using more horses. In Illinois, I raised an eighty-acre orchard, and found that a short singletree and a short tug were best. We had a short tug running over the end of the singletree, and rarely barked a tree; if you will use the same horses all the time, they learn just how to swing. When I had to plow, I was careful to make no back furrow between the trees, and was ready for planting. Mark off in cross-rows, and take the planter and plant it by hand, and you have a check-row field in your orchard. It will occupy no more time in attention and cultivation than if there was no orchard in the field. In cultivating both ways you have clean cultivation, and, if the borer must be fought, you have everything clean excepting a few weeds about the tree; and I know of no other way to manage them but the old-fashioned "man with a hoe."

B. F. SMITH: In strawberry culture I have used the Planet cultivator for fourteen years, and find it the best. I believe in the old-fashioned hoe. In the

spring I use a five-tooth and a thirteen-tooth cultivator. This is run three or four inches deep. Then, when rain comes, the old-fashioned hoe is the best tool. If I could get a man to hoe as I do myself I would pay him fifty cents per day more than regular wages. It is hard to get a man to bend his back. As long as we raise strawberries we must do a good deal of hand work. Dixon spoke of a strawberry planter; I know of nothing better than hand planting.

J. W. GREEN: I have five acres of orchard that has not been cultivated for years. I believe in mowing it and letting the undergrowth fall down. I find the ground so mellow that my shoes sink deeply in walking through the orchard. The moles and earthworms help the work. This mulching is four or five inches deep. Now, should I keep on thus, or should I use some of the machinery referred to? I want to know what I am now to do with these five acres that are so mellow that I sink deeply where the clover is growing.

D. G. WARR: We use a disk harrow with four disks on a side. Two horses pull it all right, and we are well satisfied with it. It keeps the ground loose and mellow.

SPRAYING.

By PROF. S. J. HUNTER.

Early in April, 1900, the following letter was sent to several horticulturists:

"DEAR SIR—In accordance with previous arrangements, I send you the plans which will be followed in a block of 500 trees which I, myself, will spray as a test. This outline you will follow and keep an accurate note upon everything pertaining to the work. Following is the formula: Paris green, 1 pound; freshly slaked lime, 2 pounds; water, 160 gallons. First, be sure you have pure Paris green; some of the material placed upon the market is composed of colored lime, flour, or other adulteration. Place some in ammonia, and if it dissolves, leaving no sediment, you may know that it is pure. Mix it and the lime with just enough water to make a thin paste; then pour this mixture into the required amount of water and allow to stand at least twenty-four hours before using. This spray should be applied with some good spraying-pump, having some kind of stirring apparatus to keep it thoroughly stirred.

"The next question is when to apply it. A careful study of the life-history of this little worm of the codling-moth shows that it usually enters the apples at the blossom or rose end; therefore, the object of spraying is not to cover the leaves, the branches, nor the apple, but simply to fill the rose end of the little apple with it, so that the little worm's first breakfast while tunneling into the apple will be largely composed of Paris green, a substance which will unquestionably cause serious consequences to the worm in question. After the apple has set four or five days the rose or blossom end closes up; that is, the calyx at the outer end of the apple folds in, after which it is impossible to get any of the fluid into this cavity, and the work of spraying then is time and labor lost. Here is where many fail in the desired results.

"To use the poisonous spray most effectually, we must understand that it is necessary to fill the blossom end of each apple with poison within a week after the blossoms fall, for this is where the little apple-worm gets its first few meals, and it is practically our only chance to fill it with this spray. Watch the developing fruit as the blossoms are falling, and remember that while the falling of the blossoms is about the time to begin spraying, the closing of the blossoming end is always the time to stop spraying. There are only four or five days in which the work can be done effectually. One or two thorough sprayings are sufficient, provided that at least twenty-four hours intervene between the work

and rainfall. Get your spraying machine in working order at once, and if necessary write me upon any point which you may desire further information. Do not fail to keep note upon the way you mixed the spray, the time when you sprayed, the amount required for each tree, the number of times sprayed, and other observations, all of which will be of interest."

REPORTS ON SPRAYING.

A. E. Dickinson, Meriden: There were but few wormy apples early in the season, either in the sprayed or unsprayed trees, nor were there many at picking time except among the Ben Davis, in the sixteen-year orchard, where there were more at picking time than ever before. Neither I nor the man who assorted the apples, nor the pickers, could observe any difference in the number of wormy apples among not-sprayed, sprayed or twice-sprayed trees. Bitter rot nearly ruined the crop on a portion of the Ben Davis trees in the sixteen-year-old orchard. The best apples in the orchard—largest, fairest, freest from worms and bitter rot—were in the lowest part of the orchard, the greater part of which was not sprayed. So far as I have been able to observe, I have derived no benefit from the spraying.

A. Oberndorf, Centralia: I cannot see much difference, except as to quality. The fruit on the sprayed trees was less damaged by worms.

J. A. Thompson: In regard to my spraying experiment of April 27, you visited me, and we selected a block of trees (100) in the southwest corner, about twelve years old; varieties, Jonathan, Missouri Pippin, Minkler, and Ben Davis. On May 4 I sprayed this block, the calyx lobes being spread open and turned upward in a position to hold the spray. A common force-pump was used with a Wellhouse nozzle, which made a very fine spray, the pumping being done by hand. On this day (May 4) there was every indication of an abundant crop. On the 7th we had quite a heavy rain, which may have washed the spray off. On the 8th we sprayed these trees again. On this date it was very evident that there would not be a full crop, as I could find very few apples on the Missouri Pippins and Minklers. The Jonathans and Ben Davis were better, but not full. By the 12th many of the leaves, especially on the lower branches, showed the effects of the spray by turning yellow. On the 14th the calyx was closing, and on the 15th it began to rain, which continued until the 19th. By this time it was too late to spray, as the calyx lobes were closed. We also sprayed another block of 100 trees in another orchard (Ben Davis) at the same time. Our crop this year was practically a failure, but not from codling-moth. First, we had a poor set of fruit; next, the fruit was damaged by scab to such an extent as to render the most of it unmarketable. Codling-moth did very little damage compared with the scab. We had five different places in our orchard where the fruit was fairly good, and the two blocks sprayed were among these. Now, as to the real object of the experiment: there were no satisfactory results, as the trees sprayed were not any more free from worms than the other good blocks which were not sprayed. I can only say that it certainly did no harm.

Wm. Mitchem, Argentine: I followed the suggestions contained in your letter of last April in spraying for codling-moth. The spray was in the proportion of one pound Paris green and two pounds unslaked lime to 160 gallons of water. For convenience, I put five pounds Paris green and ten pounds lime separately into water to soak and slake. Soon as the lime had slaked I worked it to a paste and placed it and the Paris green in a barrel, added sufficient rain-water to make twenty gallons, and stirred it thoroughly. After I had allowed it to soak for twenty-four hours, was ready to spray. To each forty-gallon barrel of water I added one gallon of the mixture, stirred thoroughly, and sprayed with mist

spray. I used sprayer with two hose. Keifer pears sprayed April 28 and May 3 were good quality and full of fruit. I commenced spraying apples for codling-moth May 3, and finished May 9. Our seven year-old trees used between two and three pints per tree. On Gano and Winesap I have an average good crop. They are not free from the insect pest. My Ben Davis have been badly infested for the last three years. This year, while not free, they are much improved and have not dropped so badly. We are gathering and storing the winter varieties. I intend to spray another year when the apples are at the same stage of growth, but make the spray twice the strength, and spray twice, if possible. The work crowded so much last spring that I was able to spray but once. I consider it a benefit this year, and think the spray could be made much stronger, to destroy the young codling-moth, without injury to foliage.

S. S. Dickinson, Larned: My first spraying was April 24 and 25, using Bordeaux—mix vitriol four pounds, lime four pounds, arsenic one pound; mix in sixty gallons of water. Sprayed the whole orchard. Buds were opening on Pippins, Winesaps and Ben Davis April 27, 28, 29, 30, May 1. Trees a perfect bouquet. We had two and one-half inches of water fall during those days. Sprayed again on May 4, using Bordeaux and one pound Paris green to the fifty gallons of water. We sprayed 100 trees. Some trees with Paris green on May 17. Two rows—eighty trees—left without spraying; balance of orchard with arsenical mixture and Bordeaux, one to five times. Owing to rain and wet weather the work was done between showers, and could not keep track of time; a few trees, later bloomers, were full of apples—Early Harvest, Red June, Wine, Cooper's Early White, Huntsman, and Janet; the amount of material used, one gallon on ten-year-old trees; twenty-year trees, two gallons; by driving on both sides every twig was thoroughly wet, rains next hour washing it off. To get at canker-worms, May 16, a barrel sprayer on a sled with horses was stuck in the mud, yet the worms flourished. On trees not sprayed, the apples were all wormy; sprayed with Paris green, two sprayings, two-thirds were wormy; two sprayings with arsenical mixture, one-half were wormy. A third spraying on a few trees May 22, but very few wormy apples.

DISCUSSION ON SPRAYING.

PROFESSOR HUNTER: The question of spraying is getting pretty old. We concede that it pays to spray. We find very few that do not agree that it pays to spray fungous diseases, and few who advise spraying for the codling-moth. It was the intention this year, when the outline of work was laid out, to find out whether spraying was beneficial in disposing of the codling-moth. Regarding the life of this moth, a brief review will not be out of place. At this season we find the cocoon in cells around the roots of the trees, which have perhaps been wrapped with paper to help them secrete themselves. In the early days of spring they come out and lay their eggs. Now, experiments have proven that about ninety per cent. of the young worms that hatch grow to maturity. We went into an orchard and found newly hatched worms. They come to maturity, get down into the apple, causing premature decay, and between the 1st of June and the 1st July, in this locality, pass through the chrysalis state and come out again from the half- or full-grown apple. Now, it will be apparent to you that it would be highly improbable to throw into a single apple enough of the spraying fluid to kill it; so that spraying of the second crop seems to be unnecessary, or at least useless. Spraying experiments this year were directed solely to the first crop. To illustrate, if you will just use a spray pump, it is essential to have something at the bottom that will stir the mixture, and to have two nozzles—the Vemoral for fine spraying and the Seneca for the coarse spraying. It is possible to fill the

tree with enough liquid to do the work, but after the buds have closed up it is wasted. There are only a few days in the season when spraying for codling-moth is of advantage. The different varieties should be sprayed at different times. So I would merely suggest that possibly when the work has been unsuccessful, the time has been unfavorable. I think if I take up the correspondence had with several members of this Society who carried on the work during the season, without going into details, that it will illustrate the point in question. The point we want to find out is, whether it pays to spray the first crop. To get the second brood is another question. To get the second you may do as told yesterday—knock them off from cloth bands into a good strong solution of kerosene.”

J. W. ROBISON: What is the matter with using the clothes-wringer to kill them with?

PROFESSOR HUNTER: That is a good way. . . . The spraying we did was on the farm of Mr. Polk, near Lawrence. We did the work and allowed him the results. The spray pump used was the “Pomona.” . . . We produce in this state two broods of codling-moth. The second brood will be considered later.

PROF. E. A. POPENOE: Why do you use Paris green instead of London purple?

PROF. S. J. HUNTER: There is more arsenic in Paris green than in London purple.

PROFESSOR POPENOE: Why not use pure arsenic?

PROFESSOR HUNTER: It is more expensive.

PROFESSOR POPENOE: Do you use blue vitriol in this mixture? Will it answer the same purpose as the Bordeaux mixture?

PROFESSOR HUNTER: You make your mixture the same as the Bordeaux mixture—six pounds blue vitriol, four pounds of lime, and use it in the Paris green solution. Make them separately; mix your lime and blue vitriol in one, and the Paris green in another, and pour them together.

PROFESSOR POPENOE: I understand that London purple is far from being a chemical compound, and that its commercial value cannot be depended upon without its being analyzed. I understood Professor Hunter to say that he let the mixture stand twenty-four hours before using it. I have always understood and practiced that, owing to the insolubility of Paris green, and also owing to the danger coming from spraying sound fruits, especially with soluble arsenic, that it should not be allowed to stand at all. We experimented with a quantity left over in the pump, and next morning the soluble arsenic was so strong that we simply dropped the leaves off the trees by the application. My experience is, that the quicker you can put it on the trees after it is mixed the better. The more soluble the arsenic is the more danger. It would seem that it is nothing to know that the spraying was done on May 5, unless you know the date of flowering. The date at one season gives us no clue to the date of the season the next year. The general drift of this experiment has been pretty well passed over for many years. I would say that Professor Hunter has practically, except in the amount, carried out the same experiment that was carried out in the Kansas Experiment Station in 1888. We made some experiments there that may be of interest. We found it a fact that two sprayings did more good than one, and that three sprayings did more good than two, being about ten days apart. We found by actual trial that two sprayings were decidedly better than one, but three sprayings only slightly better than two, for the codling-moth alone.

J. M. IRVIN: Is not Professor Hunter mistaken in saying white arsenic is more expensive? At the Illinois state meeting two weeks ago it was recommended that white arsenic be used because of its being less expensive.

MAJOR HOLSINGER: I want to say this—that even science is learning some

things. You know, Mr. President, that our professors ten years ago told us that Paris green was a panacea for everything. I defy any one to prove that a codling-moth has been killed by Paris green. Do you know, Professor Hunter, that you have ever killed a codling-moth with Paris green?

PROFESSOR HUNTER: I have seen the dead worms.

MAJOR HOLSINGER: I will say that if we were to use the method you spoke of in banding the trees, we would *know* what we had. When I place a band around a tree and catch ten or twelve of these moths, I *know* I have gotten that many, and when we know that the mother moths each contain 200 eggs in their bodies, we know that we have gotten just that many. I do not believe that you have killed them with a spray. I know of one man who is read as an authority on this subject who was never in a horticultural meeting in his life. I say we have lost, and I believe that through this spraying contest that has been going on that the insects have gone on, until to-day a perfect specimen of an apple is almost unknown. The same is true in regard to the war on the curculio. When I get one between my thumb and finger I know I have it, but I doubt if they are killed by spraying.

R. DE GARMO: I must say, in all honesty, that I have killed thousands and hundreds of thousands of canker-worms. About twelve years ago I got a spray pump, and I not only sprayed my own trees, but those of my friends and neighbors, and I continued to do that for several years. We have almost eliminated the codling-moth with Bordeaux mixture. If you want to know a pump that will stir up the mixture completely, the pump made by Morrill & Morrill, of Benton Harbor, Mich., is just the pump. I have used it for several years. I have used the Bordeaux mixture, and its effect on the trees has been beneficial. The leaves are very dark, and look rich, while we have some very poor material to work with. London purple has been almost worthless. We have resorted now to Paris green, which is just a little better, but not perfect, but with all the spraying for the codling-moth, there is one thing we ought to discuss, and that is, Have we a remedy for bitter rot, which is ruining our fruit?

A. CHANDLER: Maj. F. Holsinger does not practice what he preaches. Another attacks our report from our own county, as coming from a man who is not a horticulturist. I want to say that the apples gathered for the Paris Exposition, for the most part, came from that orchard. It was very difficult to get apples that were perfect. I would like to talk about spraying machinery that has come to my knowledge that has not been mentioned. It combines both economy of time, utility of execution, and thoroughness of work, and it will do away with all of these liquid sprays, cider-mills and insecticides except one (kerosene emulsion), and it can be used in about one-third the time. This machine is perfect, and does the work by using dust lime, which is harmless. While I have not used it, I have seen it used, and wish to recommend it for use. I think that the aversion to spraying comes from the using of water and the character of the work. Now, this machine is in process of introduction. I have no interest whatever in it, but do believe this lime dust will be more effective than the liquid sprays.

EDWIN SNYDER: It makes me out of patience to have any one remark, after doing a large amount of spraying, "there is no harm done." It seems to me that if I worked a machine as hard as these pumps work and got no beneficial results, that *harm is done*.

A. H. GRIESA: Reference has been made to banding in the forks of the trees. I did not make my explanation as complete as I ought to have done, because I thought the people here could work such things out for themselves. I do not

think it is advisable to leave papers in the forks of trees. With paper wrapped against the body of the tree the larvæ are collected in it. A good share of these larvæ will stay on the tree. We tried the clothes wringer this summer but found it did not work. Do not remove the paper from the tree, but take a smooth stick or knife blade and rub on the paper up and down the tree, pressing hard enough to kill the larvæ. Now, those that come on later, you need not bother about, as the birds will care for them.

B. F. SMITH: When we began collecting apples for exhibition at the fairs it was several years before we heard anything about spraying, and we could then get good specimens, but since we have been spraying, and paying no attention to keeping the weeds down and the fences up, it is far more difficult to find perfect specimens. In my opinion, spraying does little, if any, good. There is an orchard near my farm. I was there this summer and could not find a perfect specimen. Blackberries were between the trees in rows and the ground had not been cultivated. Again I object to the use of poison. If you will get up something without any poison I will indorse it. I believe more time and money has been spent than has been gained in the condition of the apples.

W. G. GANO: Time enough has been expended on this subject, but I hate to see cold water thrown upon the business of spraying. I want spraying to continue. We have lots to learn. There is doubt about it. Let us keep learning. Let us not drop it. I live close to Major Holsinger, and he has pounded this idea into my mind for five years past, that there was nothing to be gained by spraying; but it was my good fortune last year to travel over the state of Missouri to make the collection for the Paris Exposition, and I think some observations that I made are worth mention. I started out prejudiced against spraying. My travels were in the southern part of the state. When fungous diseases were troublesome I went to many orchards and could find no perfect fruit, but over and over again the men who had the perfect fruit were those who had sprayed and kept it up. I have a man in mind in Lawrence county who had been experimenting for five years, spraying his orchard thoroughly. I was there on the 16th of October. In that district there was scarcely an orchard with foliage on. They had made a poor growth; the only thing I could find objectionable in that orchard was the color of the fruit. He sprayed as late as September, using white lime. In that orchard you could scarcely find an imperfect apple. He had twenty-five or thirty acres of this twelve-year-old orchard. He had sold his crop of apples right on the ground for two dollars per barrel, and they went into cold storage. He picked them, the buyer furnishing the barrels and hauling them to the station. This is as good an orchard as I ever saw. At the Missouri horticultural meeting he asked what he could do to prevent his orchard from bearing. Professor Popenoe says we must look after the second brood of codling-moth.

PROF. E. A. POPENOE: That is precisely the object of spraying, to destroy the parents of this second brood. I see cropping out here and there the idea that "spraying, and spraying as a method only, is a panacea for those pests; but spraying with what, and for what? We must know what to spray with, and when and what for. My friend says that you must spray as late as September. Another here says spray three times! Such advice is as bad or worse, in my opinion, than the codling-moth. I would not say that pills will make a man well; it depends upon what kind of pills he takes. The spray recommended certainly was not arsenic. We begin spraying as soon as the leaves come out, to prevent fungous growth. Now, as to arsenic, if any one is so deliberately careless as to spray with white arsenic, I would say that he is not well informed. White arsenic should never be used in a spray, unless it is mixed with something less

soluble. I do not care to have any contention with Brother Holsinger, but would like to ask him if he ever saw a codling-moth that was fed with arsenic that was not killed?

EDWIN TAYLOR: We are spending a good deal of time on this subject, but it is *the most important one on the program*. When I came to sell my apples this fall I had 1500 barrels, and I had only *three* perfect apples. The men would ask me why I did not spray, like Mr. Bayliss. Mr. Bayliss, like our president, commenced with his hands, and is now worth a quarter of a million. I went to see him this fall, and his trees were sprayed. The *philosophy* I am not interested in. Some uphold it, but it is the balance-sheet at the end of the season that tells. Mr. Bayliss tells me that it pays him to spray, and pays him well. He is not satisfied, but it pays. He told me that there were, no apples in his neighborhood but were scabby and wormy like mine, and that his were the only apples in the neighborhood that were sprayed. He said that spraying properly done, at the right time, and in the hands of the right kind of people, pays well. It is only the experiments that have been made on a large scale that are worth considering.

A. L. BROOKE: I have listened to what has been said about spraying in Kansas, and I think if this goes to other states, it will show that there has been about as much poor success as spraying done in Kansas. I believe spraying pays, and that it is worth while for horticulturists to favor it. I believe that spray pumps are made that will not wear out a \$1.25 man. One pump mentioned here, Morrill & Morrill. I know it. You do not have to fix it to-day to use it to-morrow. You do not have to repair it constantly. I believe all that my scientific friends tell me, that *spraying does* pay, and that it *does* destroy insects; I believe we should accept this statement, and make up our minds to do the best we can.

B. F. VAN ORSDOL: The commission men recognize its value as well as anybody. Fifteen or twenty of them visited my orchard this fall, and all asked if I sprayed my trees. I told them I did. I believe they prefer to buy of the man who sprays, instead of the man who does not. They find more good apples in sprayed than in unsprayed orchards.

J. M. IRVIN: Mr. Dunn, at the Illinois state meeting, stated that at the Paris Exposition they could tell every package of apples that were sprayed; that spraying retarded ripening, and that he talked with Mr. Newhall, an extensive buyer, and he said he did not intend to visit orchards any more that were not sprayed. The proportions of arsenic spray I spoke of are as follows: One pound arsenite of lime, two pounds sal soda; boil fifteen minutes; it is absolutely colorless; pour it off into a gallon jug and it will not crystallize. Use one pint of this to fifty gallons of water, the same as with Paris green.

J. H. WHETSTONE: We find it better and handier to use Paris green or London purple than this mixture. They are like the Morrill pump—always ready. This pump will throw a spray at least a minute after you quit working it, and when we go from one tree to another we use the cut off. So far as the codling-moth is concerned, I am satisfied that spraying has done great things for us. We lost more apples this year than ever before, by a little prick, about the size of a pin hole, in the apple; soon after this is noticeable the apple begins to decay.

B. F. SMITH: Bitter rot?

W. G. GANO: We call that "goose eye" in southern Missouri.

J. W. ROBISON: I would like to say just a word in reference to Mr. Dunn, because it is a fact that what some men say about a matter is worth more than what others say. Mr. Dunn, from the time he was fifteen years old, has made

the apple a study. I have been well acquainted with him. He is the best judge on nomenclature in the West, to-day. He has had possibly as much experience in spraying as any man and he has followed it up. He was teaching his father how to grow apples by the time he was sixteen years old. Now, we can put a great deal of confidence in what Mr. Dunn says; he has been president of the Illinois Horticultural Society; the people made him a state senator to control and help make laws in the interest of horticulture.

MR. VAN HOUTEN: I hesitate to say anything on the question before the Kansas State Horticultural Society, but it seems to me that the discussions here to-day are of a character that would have a tendency to confuse rather than instruct. Spraying originated in Iowa. John M. Dixon, who has been dead so many years that many here would scarcely remember him, was the man who introduced this idea of spraying. He used white arsenic. Now, the question of spraying is one that has many different things that may cause its success or failure. Let me give you, now, the result of spraying in one instance that would seem to be so conclusively in favor of it that there could be no question. Mr. Cole obtained fine samples of fruit for the Omaha Exposition, and when he inquired why the fruit was so fine, the answer was that the orchard had been sprayed. He questioned as to how and when. The man went to town and bought a pound of London purple and put it into four gallons of water and sprayed with a little window pump. The true statement was that he got this fine fruit *in spite* of spraying. If you investigate this you will know that it would have the opposite effect. You may spray at a time when the circumstances are not favorable and it does no good. A hundred things may go to make the circumstances unfavorable. Now I believe in spraying, but do not believe in the haphazard spraying that has been done for the last twenty-five years. I believe that every society should appoint a standing committee, and they should be listened to every year; and they could give some definite information in regard to spraying. I believe that spraying, as now generally done, results in loss of time and money.

FUNGOUS DISEASES.

By F. L. KENOYER, Independence.

The closing year of the century has passed into history, bringing with it the usual round of blights, scabs, spots, rusts, mildews, and rots, although, upon the whole, the damage done by these diseases was not nearly so great as during the previous year. In many cases the diseases were so slight as to be of little injury.

The strawberry leaf-spot or leaf-blight, sometimes erroneously called rust, injured some varieties, while others were wholly unharmed, being immune to the disease. The Marshall and the Belt had their returns reduced by this disease below the limit of profitable production. We should select and cultivate only such varieties as are comparatively blight proof. A (to me) new disease appeared on a few varieties this year—a species of mildew, turning the leaves white on the upper side. The Marshall only was injured by it. I do not recommend spraying the strawberry, as we have too many splendid varieties that are almost entirely free from all diseases, for us to go to the expense of spraying the tender sorts. If, before setting, we would dip the tops in sulphate of copper solution, we would destroy every disease germ, and for one year, at least, have a perfectly healthy plantation.

The black raspberry was slightly injured by a disease I think identical with the blackberry leaf-blight. The anthracnose almost forgot to visit us this year. The canes are, for the first time in years, uninjured by this troublesome disease. The red raspberry, so far as I can discover, has no injurious disease.

The only fungous disease found on the dewberry was the blackberry leaf-blight. It did no damage except on old plantations.

The blackberry was attacked this year by a (to me) new disease—a species of rust, attacking the under side of the leaves; it varies in color from ashy white to bright lemon yellow, the various shades of color being found on the same leaf. The newly formed spores are white and they shade into yellow with age.

The Kittatinny lost one-half and the Erie one-fourth their leaves by this disease. No traces of it could be found on the Snyder, Early Harvest, or Kenoyer. The orange rust was found only on the Kittatinny, but did little damage. Leaf-blight appeared on all varieties—the most on Stone's Hardy and Early Harvest; the least on Snyder, Kenoyer, and Kittatinny.

Grapes where unsprayed lost about one-half the crop with black rot and anthracnose. I saved ninety per cent. of my crop by the use of Bordeaux.

The pear-blight did less damage than usual this year.

Apples suffered from the annual visits of the leaf-blight, twig-blight, scab, bitter-rot, etc. A vigorous and thorough use of the spray pump seems to be the only corrective.

The leaf-blight on the cherry and a few varieties of plum is causing serious damage, both in loss of fruit and in shortening the lives of the trees. Most varieties of cherries and the Damson plum are compelled by this fungus to pass through July and August, the hottest months of the year, entirely bare of leaves. The life of the tree is thereby shortened one-half and its usefulness curtailed fully three-fourths. Bordeaux is a sure remedy.

The ripe rot of the plum damaged the crop about one-fourth and the scab as much more.

The curl on the leaves and the black spot on the fruit seem to be the worst enemies of the peach.

Cucumbers and melons were not so badly affected by the Cuban blight as usual. This terrible scourge, that found its way into our country twelve years ago from the wild cucumber of Cuba, has completely overrun our land, from Sandy Hook to the Golden Gate, and from Central America to as far north as cucurbs can be grown. It annually causes the loss of fully one-half of our melons, cucumbers, pumpkins, and squashes. Spraying has been only partially successful in combating this disease. The cucurb wilt killed a great many vines this year. It is similar in its workings to pear-blight, and, like that disease, cannot be reached by any known fungicide.

The potato scab and the tomato rot were present but did little damage to the crops.

Most of the fungous diseases I have named in this paper can be destroyed or held in check by the application of Bordeaux mixture, with the exception of pear-blight, cucurb wilt, and orange rust of the blackberry. These last attack the internal tissues of the host-plant and cannot be reached by the external application of spraying solutions. The only known remedy for this class of diseases is to destroy at once the affected plant, or the parts affected, wherever the disease appears.

DISCUSSION.

PROF. S. J. HUNTER: I simply want to emphasize one or two points made by Mr. Kenoyer. One is concerning blight. I studied it along the northern tier of counties, and my observations are that the varieties most subject to it were Siberian Crab and Rawle's Janet, and those most free from it are Winesap and Ben Davis. As to twig-blight, which causes the twigs to die, and in some cases kills the trees, we understand it as being transmitted by birds, and in cutting off

the diseased limbs from the affected ones, there is only one remedy—plant more trees. This has proved the best remedy. (?) This disease cannot be reached in any way. I desire to speak of a root disease that came to my notice this spring. A firm in Junction City sent me some apple trees that were infested by what is called crown gall. I find there has been considerable study made of it in Arizona. Some varieties of apple trees are subject to it. It is found also on blackberry bushes. It is caused by a fungus, and belongs to the family of diseases that live upon dead-wood tissues that are upon live trees. Here it is found on the apple, both on young stock and on old trees. On old trees it can be cured if cut off near the body of the tree, treated with blue vitriol, and left; but when found on young trees there is nothing to be done but plant anew. A slimy mold grows on the surface. Note this in the purchase of trees.

A. L. BROOKE: The crown gall that first came to my notice was on trees that were raised on ground that had never grown trees before. Old nurserymen—particularly this one—say that such varieties as Wealthy are the worst. I have thrown away fifty per cent. of the Wealthy. I have discovered more crown gall on stock on ground that has never been in nursery before than on ground formerly used for stock.

PROF. S. J. HUNTER: That is, you believe it is in the soil, and not in the tree.

A. L. BROOKE: I do not imply that soil that has not been in nursery stock is always contaminated; the first I *heard* of was on the Winesap. The first I ever *saw* was on one of the hardiest yellow crabs, on whose roots I saw crown gall as big as my fist, and the trees lived on until I dug them up and shipped them back to the man from whom I obtained them. Now every tree we find that has crown gall on it goes to the brush pile. I would like to know why our hardiest varieties are attacked by it. Wealthy budded is not as subject to it as Wealthy grafted.

MAJ. F. HOLSINGER: I would inform Mr. Hunter that in Missouri fully sixty per cent. of the Lady apples are affected by crown gall.

PROFESSOR HUNTER: Mr. Brooke says that some varieties are more susceptible to it than others.

MAJ. F. HOLSINGER: The fact that the Lady apple is so largely affected leads me to think that perhaps it is peculiar to this variety.

A. H. GRIESA: I have never seen a Lady apple tree that was not encircled with it. I have a number of trees planted twenty years ago. Up to this time I have never seen it on any tree excepting the Lady apple. I have seen enlargements on one side of other trees, but hardly think it the same.

REPORT ON IRRIGATION.

By E. D. WHEELER, Wa Keeney.

The questions that naturally arise in the mind of the eastern Kansas man, when he notices that the subject of irrigation occupies a prominent place on our program, is, Why should the time of this Society be taken up discussing the subject of irrigation? Is not this a horticultural meeting? Yes, and that is the reason why we talk irrigation. We find on exhibition here apples grown under irrigation, and notice that they are much larger than the same variety not irrigated; we hear of orchards planted from five to fifteen years dying, and of trees that are stunted or do not produce, and of others that drop their apples before maturity; of still others that are unthrifty and fall easy victims to hot, dry winds, sun-scald, and borers.

Irrigation will cure these conditions, if taken in time and properly applied. One report here stated that the best apples found in the district grew where they received subirrigation or overflow from the Arkansas river. In New Jersey

and other states experiments have demonstrated that it is profitable to irrigate small fruits in an average year, and it will insure a large yield in a dry year, when without it the cost of gathering and marketing would exceed the returns, in spite of the fact that prices are higher with a short crop. If this is true in New Jersey, Michigan, Illinois, and Wisconsin, it must be true even in eastern Kansas.

Occasionally we have a year when irrigation is unnecessary, but no small-fruit grower or market-gardener can afford to run the risk attending the need of some means of irrigation. I was pleased to hear the gentleman from Ottawa county tell of hunting land with a porous subsoil for the orchard which he desired to plant, and, finding it seven miles from home, planted the orchard and made a success of it. "Where there is a will there is a way," is as true as ever, but it is not often that we find men that will go that far to find a place to grow fruit without irrigation, especially if for family use in a home already established. More care should be exercised in the selection of the home and the orchard land. In all of our western counties there are locations where fruit can be grown without irrigation, but it is not often that the ideal spot can be found. A majority of the homes in the western part of the state cannot grow fruit or vegetables successfully without irrigation, and, nine times in ten, it must be windmill irrigation or none. A common mistake is the building of large reservoirs for a limited supply of water—the erection of large windmills and the use of large cylinders [pumps] where smaller windmills and cylinders would raise more water, for the reason they would lift water with a light wind; the leakage, loss of time and money for repairs, would be less. In strong, shallow wells large mills and pumps are not out of place. Several neighbors supplied with strong, shallow wells, or ponds, could use a portable gasoline-engine, and could arrange for a man to keep it going every day, and even at night, too.

Through the efforts of Western men we are expecting the appropriation [by congress] of at least \$5,000,000 for building large storage reservoirs in a group of Western states, of which Kansas is one. Reservoir sites have been surveyed by the government in nearly all of the states included in the group except Kansas and Nebraska. Kansas will not be apt to get even one surveyed unless she asks for it, and I suggest that a resolution expressing our desires be reported by the committee, and that it be adopted by the unanimous vote of this meeting and forwarded to our representatives at Washington. By prompt action we may be able to secure one of those that are likely to be constructed during the year. The advantages and benefits to be derived from holding back our storm waters can hardly be overestimated, even if it all evaporated. While in California fifteen years ago I found that in the oldest and largest irrigated districts the humidity of the air has been greatly increased, and that dews and showers were no longer unknown during the dry season. To all who cannot grow fruit and vegetables successfully, and who would desire to do so, I would say, irrigate if you can, even though you may be obliged to irrigate from a tank, for a tank is to be preferred to a dirt reservoir unless you have a large water-supply. Sometimes you can irrigate directly from the pump.

IRRIGATION.

By B. F. SMITH, Lawrence.

I have not had any experience with irrigation this year; but my faith in its utility is as strong as though I had been in a climate where it was actually necessary.

The abundant foliage on our berry plants this fall over that of the previous year and of other dry seasons is certainly evidence that our berry plants need

more water at the close of the summer and in early fall than we are aware of. Water applied to the soil, whether from the clouds or artificially, gives life and beauty to living vegetation. The time is near when all the living streams in eastern Kansas will be corraled and caused to flow over our thirsty fields, on all the lower levels, during dry seasons.

Water and sunshine met in proper proportions on all berry patches in eastern Kansas this year; proof of this is seen in the astonishing growth of young orchards and the usually vigorous growth of our berry plants.

Our Society, Mr. President, should be friendly to and foster irrigation schemes in our state. It is often said that our soil needs special fertilizers for crops; but this year experience convinces me that it is water—water frequently applied, to reduce the elements of our soil to a condition that plant life can appropriate it to its needs. Let every fruit man, farmer or gardener who has a stream of water flowing through his farm stop that waste of fertility running from him, and train it to flow over his thirsty fields, thus increasing the wealth of our great state.

ORCHARD AND PRODUCE UNDER IRRIGATION.

By G. T. GALLOWAY, Wa Keeney.

I irrigate my garden, orchard, and potato ground, using a one-horse-power engine, which operates two 6x14-inch cylinder pumps. The water is raised about fourteen feet, from the Saline river, into an eighty-barrel tank, then led from tank in four- and five-inch pipes to the outer [higher] edges of the land to be irrigated and emptied into a ditch which crosses the upper ends of rows of potatoes, asparagus, beans, peas, radishes, etc. I tap the ditches where it will allow the water to run down on both sides of every row a distance of thirty rods, letting it run long enough to thoroughly soak the ground, then changing the opening in the ditch to a new place, and so on, until the ground is gone over; it takes about three days to go over the five acres of ground I have under irrigation. The number of times I irrigate this land during the year depends on the amount and time of rainfall. One year I irrigated once only; some years I have irrigated four times during the growing period. Fruit-trees only need irrigating twice during the very driest season, and then very thorough. If watered lightly and often, the feeding roots will grow near the surface.

In watering pumpkins, squashes, peas, and beans, I find it very injurious to let water and sunshine to the vines at the same time, or the sun to the roots after watering. Turnips, beets, radishes and onions are not thus injured. The earth should be stirred [always] as soon as dry enough after watering.

Potatoes (Irish) should be watered when in bloom, and again when tubers are well developed. Water all garden-truck, vines, etc., any time when the ground is getting dry. Keep the earth well stirred, and do not roll or in any way pack it. Irrigation makes the soil solid and hard if not well fertilized and tilled. Ground that has been manured requires more water. I have practiced raising garden, vines and potatoes without rain, depending altogether on irrigation, in Trego county, for sixteen years, with wonderful success. A small garden can be irrigated from a well. Well-fertilized sandy loam is the best for garden-truck, vines, plums, and berries, but is not so good for apples. An occasional shower is nice to wash off the dust and insects. Twenty-one years in Trego county, sixteen of it under irrigation, has demonstrated to me that any one can have all the vegetables, potatoes and small fruits that an ordinary family needs by irrigation, and that from a common well, although river, creek or pond water is better. Reservoirs which give the water a chance to warm are made of sod or scraped

out on sloping ground. I have seen finer gardens raised this way than I ever saw in Illinois, where the rainfall is very plentiful.

Strawberries do well under irrigation, and are much finer than those raised where it rains, as rain dirties and bruises them. Under irrigation one can give them just enough and no more, at the right time.

DISCUSSION.

DR. G. BOHRER: I have had experience in constructing reservoirs, and would say, place it on high ground and do not lay it off too long. My well, which is 100 feet deep, with a double-action pump, will keep a pond [how large?] filled. I am asked if I raise carp. No; might as well turn hogs in; get sunfish. There are two varieties, and I have shot them that measured twelve inches long. I had a few bass, but they ate the sunfish and each other. Put your pond on the surface; do not put it below the surface. If put above, the water will run where you need it. Make the dam four or five feet thick at the top, and ten feet at the bottom. I plant cucumbers on the north slope of the bank and they bear profusely, as fine as you ever saw. [A deep place that cannot be drained off is nice for fish and water plants.—SEC.]

W. G. GANO: How large a pump do you use?

DR. G. BOHRER: The ordinary chain pump will do, but I prefer a three-inch cylinder pump with a ten-foot windmill. I have expended \$500 or \$600, and do not know that I have it back yet, but I mean to in time. If I were to put in another I would profit by experience. I drill the well with a ten-inch auger. The greatest difficulty was in keeping the sand out. I bored down below the water-bearing sand to a head of stone and curbed down to that. First, after making the pond, I built a milk-house, put the mill to work, and let the water run first into the milk-house, from there into the stock trough, from there to the truck-patch, and keep the mill going the year round. Let it work; that is what you bought it for. You can make it a source of profit. I live in Rice county; our supply of water there seems to be inexhaustible. A large amount of water can be saved, if care is taken to have a spillway so that the water will run around instead of over the top of dam. If I had a lake with a sufficient amount of water, I would use a centrifugal pump, such as is used at the soldiers' home, in Dodge City. They raise an immense quantity of vegetables. The discharge pipe is three inches in diameter; it is run by an eight- or ten-horse power engine. A gasoline-engine would be the least expensive.

SECOND DAY—EVENING SESSION.

DECEMBER 28, 1900.

PRESIDENT WELLHOUSE: Mr. G. C. Richardson, president of the National Apple Shippers' Association, the owner of one of the largest cold-storage plants in Kansas, and the principal owner in an 800 acre commercial orchard, is here and we want to hear from him. As he cannot stay long, we will hear from him now.

G. C. RICHARDSON: It was through your worthy president that I received my first experience in the apple business. In 1886 I had an order from a man in Albuquerque, N. M., of such size that I determined to fall back on Mr. Wellhouse. He gave me very little light; so I left it to his judgment, and he loaded the cars with Winesaps, Romanites, and Ben Davis, and the receiver asked for information as to keeping qualities, so that he might know when he ought to use them. I sent this in writing to my customer, and he replied that he felt sure of the keeping qualities of one of them because of its size. I was much disap-

pointed, as he demanded a reduction of fifty cents per barrel; but we have since discovered the keeping qualities of the Little Romanite. I have handled Mr. Wellhouse's apples for fourteen years, and with this exception his apples have always been highly commended. His apples have gone to Germany, England, and other distant parts of the world.

DOES VARIATION IN VARIETIES COME FROM BUD OR ROOT?

By A. H. GRIESA, Lawrence.

During a discussion of authorities at our last meeting, several cases were cited showing that varieties could be brought up and improved in productiveness by selecting and propagating from the most desirable specimens of any variety, and so make the future orchards more productive. That it is most desirable all admit, and it is the true aim of all tree growers. But can it be done in that way? That such variation is possible is proven in many cases, but is that *the* source, where certain trees in an orchard are more productive than others? If variation in bud were thus so easily effected there would be little stability in any variety, and the tendency to less production would be as likely as to the increased production sought.

It has been my study for years to ascertain *why* this variation. And the conclusion I arrive at is that there is another cause than the above, and that it is in the root. This variation is mostly noticeable in apple trees, sometimes in standard pears, both of which are grown on seedling roots, which vary in hardiness and vigor, as well as a slight variation in adaptation to the variety grafted on them.

This variation is not seen when grown on dwarf stock, as the Doucin for apple and quince for pear. It is not on cherry or plum when grown on one variety of stock; it is not on the grapes or other fruit when grown on their own roots, as on such the root growth is uniform and the productiveness or other desired qualities depend upon other conditions. It has been claimed when trees were top-grafted that the season or quality was slightly influenced by the kind of tree they are grafted upon. Thus sweet-apple trees grafted to sour kinds would make the acid in them more mild; so of other traits. But to the subject: Does bud variation exist to the extent claimed? And is that the cause of more productive trees? And can it be or is it perpetuated by grafting from such trees? My conclusions are not in accord with the claim, but I am sure it is wholly influenced by the quality or vigor inherent in each seedling root. Please remember apple-seedling roots are not of uniform vigor or other desired qualities. Those from native seedling apples are best and most wholly used. Even those claimed as *French crab* seedlings are the pure common apples, known as *Pyrus malus*, not *Pyrus baccata*; the latter or some of its kind may produce more uniform seedlings than does the *P. malus*, but they are not being used to any extent. I have no knowledge on that point. They are being recommended in the far north since the cold of two years ago as a more hardy root than *P. malus*, and they may develop other worthy merits for this section.

Since the appearance of so many diseases of our apple trees in orchards, it has baffled scientific men to tell the cause or provide a remedy. In some cases they do not even agree as to the primary cause—whether it is a bacterium or a fungus. It is known that some varieties are easier subjects than others. In some kinds a disease comes in one form; in others in a different form. I refer to the apple-tree rot. On Grimes's Golden it forms on the roots, and generally ends the life of the tree at twelve to fifteen years. On Ben Davis it takes the body and large limbs, and terminates in fifteen to twenty years. It sometimes affects the Missouri

Pippin and others. Our sanguine friends of bud variation have not sought to avoid that by selection of proper trees, but I am hopeful of being able to solve it, as trees grown fifteen or sixteen years are as exempt from such injury as others not liable to such diseases.

Years ago the Grimes's Golden was extensively planted in our county. They made fine trees and produced choice apples abundantly; but soon the trees died at the root, so that, of thousands planted, but few only of the younger trees remained. In my orchard two rows of twenty trees began to bear and die about the same time. I noticed the injury was all in or near the ground, and the idea came to me to get a variety not thus affected, and graft on the young branches; the result is, the trees are healthy, vigorous, and uniformly productive, the old liability to disease in that variety is overcome, and it points out the way to success. I have been looking for a healthy tree for a stock.

It adds to the cost, as the tree needs to be twice grafted, but the gain cannot be computed when you consider the longer life of the tree, sure indemnity against root-rot, and, possibly, greater productiveness, and perhaps other good results.

The point desired is, more lasting orchards, greater productiveness, and better quality. To begin at the foundation would be wise, and we should use seed of a variety combining the essentials sought for. Uniform vigor and hardiness are first requirements, then energy to readily unite in budding and grafting. For these purposes, the different kind of crab, as Siberian, Hyslop, or Soulard, may be tried; the latter seems the best for stock, but it has no value for fruit. I have not seen any root gall on Soulard root, nor do I remember seeing any infested with woolly aphis; besides, it is the most hardy in all respects of any stock I know, and time and trial will determine its value for this use.

ORCHARDING.

By GEO. C. RICHARDSON, Leavenworth.

That the United States, at the beginning of the twentieth century, will enjoy the distinction of being the greatest fruit-producing nation of the world, there is no question. The rapid strides of the nineteenth century in horticultural endeavor and progress have been marvelous, and a wonder to European and oriental nations, who look with jealous eyes that America is not only able to supply her own wants, but is also a competitor in the markets of the world with deciduous and citrus fruits, both in the fresh and dried forms.

The most important of all, and that which so nearly concerns us as a nation and Kansas as a state, is the apple industry, that contains such wonderful possibilities by reason of our location, climate, and soil.

Commercial Apple Orchards.—The largest and most profitable apple orchards in America are located in the central part of the United States—in Missouri, Kansas, Iowa, and Nebraska; on the most fertile lands of the great Missouri, the Kansas and the Arkansas valleys. Apples are grown in the four states named with variable success, as well as in some of the Middle states; yet experience has demonstrated that the best apples, considering size, color, flavor, and keeping qualities, are grown in the above areas. These areas possess in a high degree the qualities of soil and requisite climate for the production of apples in perfection. The soil differs very materially in character from that on either side, being decidedly more productive and receiving a much greater rainfall.

Markets and Distribution.—The natural or tributary market for the apples grown are the Southern and South Atlantic states, principally Texas, Louisiana, Alabama, Georgia, and Florida, where apples do not grow; also in the states of Minnesota, North and South Dakota, Wyoming, and Montana, as well as the

states of Missouri, Kansas, Iowa, and Nebraska, where these orchards are located. The above-named states are buyers of Western-grown apples from gathering time until they are exhausted. During winter and spring most of the other states are buyers, and every crop year New York, Boston and Philadelphia dealers purchase immense quantities of Western apples for their home markets and for export to England and Germany.

Apples can and have been shipped from the Missouri valley to England and Germany direct, reaching their destination in good order, with profitable results, realizing \$4 to \$4.50 per barrel net.

Demand and Consumption.—American and English people have of recent years become great fruit eaters, as a result of easy and reasonable rates of transportation, together with the advocacy of fruit eating for its health-giving properties, and the apple, king of fruits, is consumed the year 'round in numerous ways, since the advent of mechanical refrigeration admits of their being kept in their original state from gathering time until the succeeding crop matures. Government statistics show the largest yield of apples in the United States in one year to be 210 million bushels; nearly one-half were of inferior quality and undersized, a portion being utilized by drying and for cider; yet the demand exceeded the supply, as the following spring few apples remained in cold storage, and they commanded such high prices that the wage-earners were barred from their use. For several years, even in February and March, apples have commanded from \$3 to \$5 per barrel of three bushels. With our rapid increase in population, and the enormous demand in Europe for American apples at reasonable prices, when it is considered that it requires several years to grow an orchard, and, at the same time, many old orchards in the early settled states are on the decline and passing away, it must be many years before the supply can equal the demand.

Production.—The yield of an apple orchard depends on its age and the care given. In the area described, orchards will bear a few apples at five years from planting, and at seven will produce from one to three bushels to the tree, or 75 to 200 bushels per acre; at fifteen years from planting they will produce on an average from three to five bushels per tree, or 200 to 300 bushels per acre. If such care and attention are given an orchard as a man gives his business affairs, the highest results will be obtained.

The state of California is famed for producing large yields of handsome and attractive fruit, such as pears, peaches, prunes, grapes, apples, oranges, and lemons. The phenomenal success of those engaged in fruit-growing in California is attributed almost entirely to the thorough and practical cultivation of the orchards and the proper care in selecting and packing the products for market. Their sales extend to all parts of the United States and many parts of Europe, and, notwithstanding the great distance from markets and high freight-rates, those engaged in this line make fabulous profits, and some orchards are valued at from \$1000 to \$2000 per acre. The majority of orchards of other states show neglect, and a lack of proper cultivation and proper care of the trees, which causes tend to greatly reduce the quality and quantity of the fruit.

Kansas has in an eminent degree the very essential requisites of climate and soil for the production of large yields of apples of superior quality. I claim that a bushel of apples can be produced cheaper than a bushel of corn, and more than double as many bushels of apples can be gathered from an acre of orchard as from an acre of corn. I fully believe that, were apples sold low enough to permit the wage-earners to use them as a regular article of food, there could not be enough grown to supply the demand. Let apples be taken out of the class of luxuries—

which they are, even at point of production—and it becomes not a question of a market for the apples, but of apples to supply the market. A great work is before the apple orchardists of the United States—to build up the apple industry, now so seriously neglected.

The progressive apple grower adopting practical and scientific methods of cultivation, leaving no undesirable vegetation or undergrowth to absorb or evaporate the moisture and to exhaust the soil of necessary plant-food for the growth and development of tree and fruit, who also sprays to stamp out fungous diseases and exterminate insect pests, is the one reaping a reward in large yield of perfect fruit.

The paramount issues to-day in horticulture in Kansas should be militarism and expansion; of militarism, by raising and encouraging an army of workers to exterminate the insect pests invading our orchards; of expansion, by possessing our great areas of superior orchard lands and planting them to apple trees.

The horticultural pioneers of the West concede to Kansas first honors for her advantageous location and excellence of soil; also for many first prizes and honors obtained by this Society, won at the Centennial in 1876, New Orleans in 1886, Chicago World's Fair in 1893, and Paris Exposition in 1900, Omaha, and elsewhere.

Kansas being practically the geographical center of the United States, with nine trunk lines of railway at her command for distribution of the products of her orchards at equitable freight-rates, with climate, soil and intelligence to produce the finest and best quality of apples known to the commercial world, there should be no hesitation in making Kansas famous in the production of quantity over any other state in America.

It is not an impossibility in seven years to be marketing twenty millions of barrels of apples annually (and the orchard as yet only occupying the roughest lands, least suited for grain crops), with the Horticultural Society of the state directing its energies in the same way that the commercial organizations of our cities find necessary to employ.

You can be the means of adding greater wealth to the state of Kansas.

WILD CURRANTS IN KANSAS.

By R. N. BAKER, Grantville.

Ribes foetid, or *Bitter Currant*.—Stems and branches decumbent and spreading; petioles slender, one to three inches long, pubescent, hairy, or downy; corolla yellow; sweet flavored. Racemes [fruit clusters] appear from the same bud as the leaves; bracts short, not joined together; fruit black; thick skin; one-tenth to one-fourth inch in diameter; fruit filled with mucilaginous pulp, with malic or citric acid, and from eight to thirty-two seeds; seeds small, not larger than a flattened turnip seed, with a skin so tough that birds will not digest them; this is why it is so widely scattered. It is found in cold, wet places, and as far north as British Columbia, along the Rocky mountains to the south part of Colorado, as high as 6000 feet. It flowers from May to June, according to the location. Fruit ripens from July to August. Mode of propagation is from seed and root runners. The fruit is not pleasant tasting. It is sometimes called "skunk currant." It varies in taste in location. In damp, shady places it is more mild and somewhat pleasant to the taste, and considered quite healthful. The first fruit holds to the stem well, becoming quite dry before falling off, thus furnishing food for birds and animals for a long time.

Ribes aureum: In general character similar to many other kinds. Stems and branches smooth; leaves three-lobed, dentate at point; petioles slender

longer than leaves, two or three inches long, pubescent; corolla yellow; sweet scented; racemes appearing from same bud as the leaves; bracts linear, as long as the pedicels, not joined together; fruit smooth, one-eighth to one-half inch in diameter; skin tough and thick, filled with mucilaginous pulp and succulent sub-acid juice, containing eight to thirty-two seeds. The seeds are small and flat, with tough skin; so tough that birds cannot digest them. They bloom in April. Fruit begins to ripen in June and continues until the last of July; it holds to the stem well after fully ripe. It multiplies by root runners and seed. Seed dropped in damp, shady places will germinate in eight days, and make a growth of six inches the first year. It grows best on sandy soil which is a little damp and shaded half the time, as the hot sun will blister, dry and spoil the fruit before it gets ripe.

Mulching with straw or any kind of litter generally improves it, both in size and quality, and it will seldom fail to bear a good crop of fruit, so attractive that children will want to go twice a day to fill themselves. They are good cooked alone or with almost any other kind of fruit; they make good pies and boiled dumplings; are also good cooked for sauce. If the seeds are strained out they make fine jelly; the juice makes nice wine. They may be used in many ways, and they are so mild in flavor that they require little sugar to make them pleasant to eat. The roots and leaves are as highly medical as the whortleberry, being both diuretic and astringent. It also makes a good gargle for sore mouth. There are a good many other kinds of fruit called currants; one that is worthy of mention is light amber or nearly white when grown in the shade. It is a shy bearer, but large and sweet and quite desirable.

QUESTION BOX.

What device for evaporating fruit, suitable to use the culls from a ten-acre orchard, can be recommended from experience?

J. H. WHETSTONE: I have a factory that I evaporate in. I got the plan mainly from Mr. Wellhouse. It is a large stone building, built for a sorghum factory. A false bottom of laths eight feet above the ground floor receives the spread-out fruit, and furnace fires are kept under it. I use sulphur in bleaching. Our capacity is from 600 to 800 bushels of green apples per day. I never examined any other but that of Mr. Wellhouse, and took my pattern from his. The building is tight, and the lath floor is laid with cracks about one-eighth of an inch in width, so that the heat may pass through. My furnace and flues are forty-five feet long.

WALTER WELLHOUSE: I will say that our evaporator [referred to] is known as the New York hop kiln. The sides are boarded up and down with common deal boards sixteen feet long, and each building is eighteen feet square on the ground; about ten feet above the ground joists are put across of 1 x 12 pine. These are thin, in order to allow the heat to pass through the floor. The floor is made of triangular strips of hard wood (poplar usually), $\frac{3}{4}$ x 2 inches. These are nailed to the joists, one-eighth of an inch apart on the upper side. The narrow edge is nailed at the upper edge of the joists, and that makes the crevice through which the heat ascends readily, yet so narrow that it will not allow the sliced apples to fall through. In each house we use two furnaces. The pipes are arranged so that they go from the furnace upward and around the room, then up through the center of the kiln to the outside of the roof. We usually build three kilns together. The apples are pared in a shed close to the evaporator, and after being cored are put in boxes with slatted bottoms. They are bleached with sulphur

inside of a box as they are elevated, and are taken out at the top and put through the slicing machine, and then emptied, about sixteen inches deep, on the slatted floor, and frequently turned until dry. We put about 500 bushels of apples through per day. Some days it takes much longer to dry them than others; that depends on the weather somewhat. The temperature on the inside ought to be 200 degrees. We lessen the heat as they dry. When they are first put in the temperature is 200 degrees, and is lowered as the apples dry. Only one floor is used. The moisture from the lower apples is retained by the upper ones, so nothing is gained by having two or more floors.

PRESIDENT WELLHOUSE: It takes a bushel of coal to dry five bushels of apples, and one man tending the kiln can dry 500 bushels per day. With a machine one girl can pare from fifty to seventy-five bushels per day. It takes two girls to trim what one girl pares. After spending much money, we have found nothing equal to this New York hop kiln. It is cheap, and the temperature, when the fruit is fresh, can be run up to 200 degrees. It usually takes about five pounds of fresh apples to make one pound of evaporated apples. Apples that are too small to pare are run through a slicer and then dried; they make ten pounds to the bushel. The price ranges from five to thirteen cents per pound—never lower than five cents; so you can see what money there is in them. I think the expense of paring was about three cents per bushel; this, with the other incidental expenses, would probably run up to nine cents per bushel.

EDWIN SNYDER: Do you dry the cores and send them to France to make champagne and wine?

PRESIDENT WELLHOUSE: We usually sell the culls to the men who make a business of drying apples. I do not know how many times we sold to New York parties. We sell them the culls and let them use our evaporators. I think that some went to Europe. We dried the cores and peelings too when there was a demand for them. I think we did not dry apples ourselves after we got the kilns. If prices were high enough, the men to whom we sold the apples dried the peelings and cores. We pick out the best fruit, and these parties take the remainder.

A MEMBER: Ever make vinegar out of skins and cores?

PRESIDENT WELLHOUSE: We tried making vinegar once, but I do not like to tell about it. We took a lot of parings and cores and run them through the cutter, and put them in a pile with the pomace, and, when they had fermented, we pressed them and run the juice into a big tank. We sent a quantity of it to a chemist, and he charged well, and told us that there was not strength enough in it to make vinegar. I concluded that the fermentation in the pile had destroyed its strength; so our vinegar made of cores and pomace was a failure. We were not successful in making vinegar of it.

QUESTION: *Which is the best cider-mill?*

J. W. ROBISON: There are a few principles that go to make up "the best cider-mill," and one is, that the apples must be reduced to a very fine pulp, and considerable power is required, and sacking is now used as a drainage. On my late visit to France, I was greatly surprised to see them crush their apples with a little wooden roller, which did not reduce one-half of the apple to pulp; the better grades of cider made from their apples sold for more money per gallon than their average wine.

PRESIDENT WELLHOUSE: I never gained by making cider. Hard cider will make a man drunk quicker than beer. I used a press which cost me \$500 or \$600. We ran it by horse power. We shipped a quantity of cider to Denver,

Colo., but it did not pay, and we soon quit. We sold the horse-power for one-fourth its cost, and the mill for one-sixth its cost. We decided that apple growing was our business, and have stuck to that.

QUESTION: What borer attacks the cherry and plum, and how can we exterminate them?

MAJ. F. HOLSINGER: If the peach-tree borer, treat them the same as on peach trees.

J. J. ALEXANDER: The best remedy is to cut them out.

J. W. ROBISON: When you cut them out do you not injure the tree? I never had a plum tree killed by the borer.

J. W. GREEN: A little hooked instrument is easily made out of piano wire eight or ten inches long, turned up at one end one-sixteenth of an inch and twisted a little to one side. Run it into the hole, and, with a little experience, you will know as soon as you hook them. I have used this successfully for twenty years. "The idea is old, the instrument new; go after the tree borers as the woodpeckers do."

JOHN FULCOMER: I believe prevention is more effectual. When I commenced to raise peach trees I was bothered a great deal. I believed there must be a cheap remedy; so I got ashes and heaped about two bushels around each tree, and I never had to catch any more borers.

F. L. KENOYER: The method now employed in my section by a number of orchardists is to use crude petroleum from a well in that section, and it has proven to be death to the borers, without injuring the trees. Several of my neighbors have used it, and their trees are in a healthy condition. The earth is removed and the oil applied with a brush.

WILLIAM CUTTER: I have found the best way to deal with them is to dig a place around the tree so that water could gather around the roots and drown the borers.

QUESTION: What is the best exterminator for woolly aphid?

MAJ. F. HOLSINGER: Tobacco.

H. L. FERRIS: Does that question mean the root-louse, or the woolly aphid?

J. W. ROBISON: They are the same.

H. L. FERRIS: I find that cultivation will kill them.

J. W. ROBISON: They do not work very deep in the ground.

CHAS. HARRINGTON: We have orchards that have borne for years that are thoroughly infested with the woolly aphid, but it does not appear to affect their productiveness.

J. M. IRVIN: At the Missouri and Illinois meetings it was decided that tobacco water poured around the roots was the best remedy.

QUESTION: What spray will control peach and plum rot?

A MEMBER: Bordeaux mixture. The standard Bordeaux mixture proves fatal to the foliage. It is the rule to reduce the strength before applying.

F. L. KENOYER: My experience is that you cannot make Bordeaux mixture strong enough to injure the foliage. I use my pocket-knife as a test. When you have added enough lime to the Bordeaux mixture to make a copper plating on the knife, it is of the right strength.

SECRETARY BARNES: Read directions for treatment of peach trees for rot, from "The Peach," as follows: (1) During the winter or very early in the spring remove from the trees and gather and burn all mummified fruit. (2) Very early in the spring it will be well to spray the trees thoroughly with a solution of

copper sulphate (bluestone), one pound of bluestone to twenty-five gallons of water. (3) When the fruit-buds begin to swell, spray either with the acetate of copper solution or the Bordeaux mixture. (4) Just before the fruit buds open, repeat the latter. (5) When bloom begins to shed, spray with Paris green, three ounces to the barrel of water; to this add about a quart of whiteash (milk of lime), or with Bordeaux mixture, adding to each barrel three ounces of Paris green. (6) In ten days or two weeks repeat the latter. (7) When fruit just begins to color, spray with copper-acetate solution. (8) Repeat the latter in a week or ten days. In preparing the Bordeaux mixture, especial stress is to be laid on the advantage of preparing beforehand a barrel of strong bluestone solution, made so that each gallon of the solution will contain say two pounds of bluestone. It is a great advantage to buy the bluestone coarsely pulverized, as in this form it dissolves so much more rapidly. In this condition, and with hot water, a large quantity of a concentrated solution of the bluestone can be made very quickly. It is also well to have another barrel filled with slaked lime or whitewash. By slaking a given quantity of lime for each barrel of the whitewash, provided the same is well stirred, it will be easy to tell about what the weight of lime is in each gallon, and thus the necessary quantity can be readily added by measure.

In spraying, use a nozzle which gives a misty spray; wet every part, but drench none. It is better to spray on a cloudy or partly overcast day, or when the sun is not too hot; the foliage is then less apt to be injured.

J. W. GREEN: Two years ago I lost all my peaches. They all rotted, except on four or five trees. This year I sprayed with Bordeaux mixture. When I went over with the liquid I also went over with the dry Bordeaux. That is my experience with the peach. I took Bordeaux mixture and painted a number of those trees. I tied a string around the limbs of the trees treated; the peaches on those trees developed nicely. I would say to those who believe that it takes moisture to make scab and rot, that, with only one or two rains in five months, nearly everything rotted, and I concluded from this that one grape will start the rot on any vine in a vineyard. It is as contagious as smallpox.

ORCHARDING.

By ALBERT DICKENS, Manhattan.

This report contains notes on orchards only which have come under the writer's observation.

Practically every tree grower insists on clean cultivation for a young orchard. The successful growers plant fewer corn rows between young trees, giving the trees more room. These growers have swallowed and digested the ancient maxim, "As the twig is bent the tree's inclined," and they largely shape the head while it is young. The disk and cultivator are doing the work formerly done by the plow, and doing it better. The orchards are not being ridged by repeated back furrowing, nor are the roots exposed by a dead furrow next the tree row. The men who recommend seeding down the bearing orchard are harder to find than they were ten or more years ago. The orchards that are being cleanly cultivated are in general making the better crops. Doubtless some members can cite cases of orchards in favorable localities that have made good calf pastures and borne fair crops of fruit. Mr. G. Spohr, near Manhattan, has drilled sixteen-foot strips of alfalfa in the thirty-foot spaces in his orchard, and his trees seem to be in good condition and bear fair crops, but observations and reports from various parts of the state point to clean cultivation as the surest road to success. Cow-peas planted late in June, and turned under in the fall, have

helped some orchards on poor land. Rye sown on land that is liable to wash or blow badly is beneficial, and furnishes calves and young pigs with winter pasture. Oats sown in autumn furnish protection, and give no trouble in the spring.

Removing watersprouts in summer is a practice gaining favor, with practically no opposition except from the many other duties that demand attention at the same time. A few growers report that where trees were cut back and thinned out last winter and spring the fruit did not drop near so badly as on thick, bushy trees. Mr. J. B. Haney, of Manhattan, secured a good crop of excellent apples from a neglected orchard which he pruned quite thoroughly. His yield was fair, three Winesap trees yielding twenty-five bushels of first-grade apples, other trees doing nearly as well.

Peach trees cut back after the hard freeze of 1899 have given varying results; young trees cut back to two-year-old wood have nearly all made fine new heads; young trees in bearing cut back to three- or four-year-old wood also made good heads. Of the older trees cut back, those that had but two or three years' wood cut off made little new wood; some died the winter following, and others are in a more or less rapid decline. Of the old trees cut back to five- or six-year-old stubs, about one-third died without starting, one-third formed poor heads, and one-third have made good heads. A considerable number of the new branches have split off the old wood, some by wind and some by the weight of fruit.

While the spray pump is doubtless the way to administer the medicine for diseases and insects, close attention must be given to sanitary conditions. To spray with Bordeaux mixture, and then leave all diseased fruit and foliage on the ground to furnish infection for the future is doubtless better than to make no fight, but it is only by using every means in our reach that we hope to in some degree lessen the injuries. The same may be said concerning the war on insects. Every means must be employed. The cider-mill and pigs are allies of the spray pump in the fight on the codling-moth.

The mallet and sheet must do outpost duty when we turn our fire on the curculio.

Let me add the short report of our most successful apple raiser in Riley county, Mr. John Tennant. Set four acres in March, 1882; trees commenced bearing in 1888; set six acres in 1891; trees commenced bearing in 1894. Have had eight fairly good crops, and four off years, in the twelve years since 1888. Net proceeds of the eight crops \$3360. Planted orchard in corn for five years. Since then have cultivated trees with disk and Acme harrow. I break off watersprouts in August. I always spray, and always raise sound apples.

ORCHARD TREATMENT IN KANSAS VARIES.

By S. S. DICKINSON, Larned.

The extended sod cutter or disk harrow does just the work desired. If followed by a light harrow, to scratch the ground close up to the trees, it will exterminate a great many of the pests we now fight with spray. This work can be done in March, after the mulch of leaves and cover-crop have done their winter work.

In trimming, I only take out enough limbs and twigs to let in the sunshine to color the apples in the center of the tree; also branches that cross; and I shorten in long, swaying limbs that often make a tree lopsided. Better cut the little twigs than the big limbs.

Owing to the heavy rainfall in May, my orchard ground was so soft that we could not get on it to spray as often as we desired, excepting on a ridge. These

trees were given five sprayings, and had no worms. The balance of the orchard was sprayed from one to three times. I used a power sprayer driven by sprocket-wheels attached on hind wheel of wagon, with chain to the pump gear, which gave us 60 to 100 pounds pressure, with a McGowen nozzle. We could spray 600 trees in eight to nine hours, using 900 to 1000 gallons of material. We drove on both sides of each row. At every large tree we had to stop a moment to thoroughly cover every leaf; otherwise the team walked at the rate of one and one-half miles per hour. The work was equally as well done as with a hand pump. This outfit is big enough to thoroughly spray 150 to 200 acres of orchard three to five times. The cost, \$100, divided between three or four orchards, would be only the price of a good hand pump, capable of doing only one-fourth to one-third as much work with the same help; yet the power wanted is a steam- or gasoline engine, light enough to be used on the wagon, with tank of 200 gallons, not to weigh more than one ton altogether. [The water alone weighs a ton.]

Cannot some ingenious Kansan come to the front with a perfect machine?

KEEPING FRUITS; MARKETING AFTER SORTING.

By FRANK HOLSINGER, Rosedale.

There was never a better time to plant an orchard than the present. The hard winter of 1898 and 1899 destroyed fully one-half of all the orchards planted, while a large percentage of the remainder are injured to a great extent and must soon succumb, and unless energy is used the apple will have passed, or at least will be beyond the reach of the poorer classes. Should you determine on planting an orchard, remember that unless you give it intelligent care you had better not undertake it. The general and increasing difficulties attending fruit-growing are so great, that nothing but the most intelligent and watchful care will succeed. There is a boundless field of profit and enjoyment open to the man who availed himself of what is already known in selecting a location, choosing varieties, fighting insects and other enemies, etc. The markets North and West are unlimited and open to us, for all we can produce; and however cheap earlies and windfalls may be, well-developed and well-cared-for fruit will always sell for prices which will make the land and the labor devoted to their culture and preservation more profitable than that devoted to any of the more common pursuits.

With the apple much loss results from indifferent picking. I think apples should be picked early to keep well. I have just been visiting the Kansas City commission houses, observing some exceedingly fine Gano apples at Rose Bros. place of business. In conversation with him, he assured me of great loss by indifferent picking. "In one orchard," said he, "1100 barrels of just such apples as you see would, if picked two weeks earlier, have made 1500 barrels; a loss of twenty-five per cent." Apples should be carefully handled, and only the best packed to keep. I think air-tight barrels best; if [each apple is] wrapped in tissue paper all the better. At the late Paris Exposition, Missouri fruit was double wrapped, in one of tissue and one of oil paper. So well did these apples keep that I am informed there was no more than one per cent. of loss. These apples were placed in cold storage until wanted, and kept as close to the freezing point as possible. Much of the loss by cold storage is caused by variation in temperature. I have known a variation of thirty degrees. Whatever plan you adopt, remember everything depends upon the evenness of the temperature.

Catching a cue from our worthy member from Greenwood county, that apples keep well in dry sand, I have eight or ten bushels in dry dust, taken from our macadam streets, which at this time (Christmas) are firm, and promise to keep indefinitely. To attempt keeping large quantities by this method is pos-

sibly not to be thought of yet. To the fruit-growers without cold storage it affords the opportunity to keep a family supply to last until new apples come again. Apples keep better this way than in open cellar, because of the exclusion of air that fluctuates the temperature. Dry dust seems always cool. This method is new yet, and I may be too sanguine. Munger's dry sand and my dry dust may not be the best, yet we claim for it a certain degree of success. In marketing apples, if carefully selected and handled, packed in barrels and kept at a proper temperature, they always command a price that satisfies. To-day first-class Ganos, Yorks and Davises sell for \$4.50 to \$5, while good, smooth, highly colored Jonathans, I was assured a few days since, would command \$10 per barrel.

There are certain conditions to be considered in marketing fruits. We who live adjacent to large cities prefer to unload our fruit on the market rather than stand the chances of other markets, at an expense for barreling, sorting and commissions aggregating not less than one dollar per barrel. It was folly to attempt to keep apples last fall, with less than five per cent. of the crop No. 1. Fully seventy-five per cent. of those sold at from forty to seventy-five cents per bushel in open packages, without expense other than hauling to market. If you are remote from a large market there is no redress; you must depend upon commission men to handle your fruit.

During last season there were surprises after surprises. The reports from the East, North and West told of immense crops. Nothing we were ever told equaled it. The middle West was an exception in the large prospects. We were told the apple crop was only forty or fifty per cent., and inferior in quality. In south Illinois and Missouri apples were attacked by fungi, bitter rot, insects, and a new disease known as goose eye, while the trees were affected with borers, root knot, root rot, scale, and what not. With us the scab, codling-moth, gouger, curculio, canker-worms and wind did much to lighten the crop. The gale that swept Galveston from the face of the earth extended inland, knocking off fully one-half of all the fruit in its course from Texas to Missouri. This did much to stiffen prices in our apple market. From a drug at fifty cents to one dollar per barrel they advanced fully 100 per cent., and continued to advance, until now good apples are worth about all you choose to ask for them, with few first class in sight.

One other thing in handling and keeping fruit: always select long-keeping varieties. I am glad to call attention to the Ingram, a new variety originated in south Missouri, of good quality, and possessing the highest merit as a cold-storage fruit, with possibly no equal, always coming out rosy and crisp, and in quality equal to Jonathan. A hearty greeting to the Ingram.

FRUIT-TREE BARK-BEETLE.

By P. J. PARROTT, Ithaca, N. Y.

Scolytus rugulosus Ratz. During the past summer the fruit-tree bark-beetle was reported as injuring plum and cherry trees at Bonner Springs and Clay Center. This pest was mentioned and discussed by Prof. E. A. Popenoe in his last report to this Society; but since the insect is apparently increasing in numbers and destructiveness in our Eastern states, where its work during the past summer has made tremendous havoc to stone fruits, it seems well to call attention again to its habits and life-history, and to the means to be employed in combating it. The losses this year from this pest are severely felt by many an Eastern fruit-grower. In some localities hardly an orchard of plums or peaches escaped injury by the pest. Sometimes the bark of the trunks of peach trees was covered with the excessive exudation of gum from the channels of the beetle.

In one orchard the injuries were all confined to the trunks, while in nearly all others the twigs and branches were badly channeled and the trunks scarcely attacked.

The most conspicuous and generally the first indication to attract attention to the presence of this insect is the withering of the leaves upon terminal twigs, giving the impression of trees suffering from blight. Close examination of the affected parts reveals small, round punctures about the size of the head of a common pin about old leaf scars, or at the base of buds and lateral spurs or twigs, from which there is a more or less gummy exudation. If the trunks and branches are inspected, the punctures will generally be found much more numerous and quite irregularly distributed. In observations during autumn, the writer found a small percentage of the channels in live twigs held eggs, while the channels in the bark of the trunks and the limbs of live trees were in no instance found to contain eggs. Most of the channels in these parts were mere short excavations, filled with hardened gum; now and then a channel was found to contain an adult beetle or a beetle just reaching maturity, still reddish in color. The beetles seem to find places in the limbs for hibernating during winter.

The adult is small, about one-tenth of an inch long, and one-third as wide, black in color excepting the tip of the wing-covers and the legs, which are reddish. The female deposits a number of eggs in a row along one side of the channel, concealing them neatly with fine chewings packed between and about them. The young larvæ, on hatching, excavate channels beneath the bark at right angles to the line of eggs. As the larva develops in size its channel becomes larger and more conspicuous, and is often changed in direction. When grown, it gnaws a little pocket in the sap-wood scarcely deeper than its own thickness, in which to pupate, and blocks the channel behind it with fine chewings. When grown, it gnaws out of this pocket pupal chamber and escapes, returning soon to renew the attack upon the tree and to deposit eggs for another brood.

The life-history of the species has not been quite satisfactorily determined, but it seems quite certain that in our latitude there are at least two distinct broods. Owing to the fact that both larvæ and beetles hibernate, it would not be surprising if there was some commingling of broods. Eggs are laid in September and October, and if favorable weather prevails, late in the fall, some of the larvæ of this late brood will develop into beetles, while the larger portion of the larvæ will not mature into beetles till spring. Eggs are deposited by these, from which a brood matures into beetles during July and August.

Experiments have demonstrated that this insect prefers weak and sickly trees, yet often attacks sound and healthy ones. Doubtless its first work in an orchard is upon unthrifty trees, which infest the surrounding trees. The presence of weakened trees and piles of decaying twigs and branches furnishes quarters for it to breed in; otherwise it would not have gained such headway as in some orchards the past season. To check this pest, care should be taken to keep all trees in the best of health. Uproot and destroy decayed trees, prune off and burn all dead and weak twigs and branches. As far as the safety of an infested tree will allow, all badly channeled twigs and branches should be cut off and destroyed, because they contain the eggs and larvæ. If, during the summer, beetles are found upon any tree, spray the trunk and branches with a solution of one pound of whale-oil soap dissolved in three gallons of water, adding one-half pint of crude carbolic acid. When applied suddenly, this kills the beetles upon the bark and those that have not channeled out of sight, and it is also repellent to older beetles that may afterwards alight upon such protected parts. Supplement this treatment with a coat of whitewash containing some Paris green.

DISCUSSION ON WHOLE *versus* PIECE ROOTS.

PROF. E. A. POPENOE: This question has been discussed here before. While we all have our idea as to the success of whole roots or piece roots, there is still room for discussion on the question. In the year of 1891 we were planting an apple orchard at the Kansas Experiment Station and decided to give the matter a trial. We sent to Stark, in Missouri, for trees grown by the whole-root system, with a view to setting them alongside the same varieties grown by Kansas nurserymen on the piece-root system. These latter we got from William Cutter, of Junction City. We decided to get them from the nearest nurseryman, and plant them alongside the others from Stark. Our selection of ground was another experiment. We had read that ground on which an orchard of twenty-five years had been carefully grubbed out, and had grown two years' crop of corn, was again suited to orchard planting.

Our trees have made a good growth. It does not show the propriety of planting or not planting on ground that has had a previous similar growth. There cannot be any superiority claimed for one tree over another because of better ground. They were planted at the same time and under the same conditions. The trees from Mr. Cutter cost ten cents each. Those from Stark cost from thirty cents to forty cents each. The extra cost was, I presume, owing to their having been grown by the whole-root system. All the trees were of common varieties: Jonathan, Cooper's Early White, Winesap, and no advantage was taken in any one case. Some piece-root trees we got from Stark were the best. Of the piece-root trees, the average height of all varieties at the present time is a fraction of an inch over twelve feet; the average diameter at the ground is $5\frac{1}{8}$ inches; twenty-six per cent. are dead. Of the whole root trees, the average height is a fraction of an inch over eleven feet; average diameter at the ground, $4\frac{1}{8}$ inches; thirty-one per cent. are dead.

WILLIAM CUTTER: I once made an exhibit of trees grown by me on all styles of roots that I could think of—little roots, pulled roots, roots upside down, etc. All took very well, but my best success was with the four-inch piece root. I believe that for an extremely cold country the better the root the hardier the tree will be. I am pleased that the best nurserymen are adopting that method. This Society made a report at that time, and I asked the president to appoint a committee to investigate, and they reported in favor of the piece root.

J. W. ROBISON: You did not find anything desirable in the whole root?

WILLIAM CUTTER: Not at all, and I left a very few. Once in a while a "crank" tells me he wants them; so I left a few for such men. The hardier the top the hardier the root. Not one-fourth of our seedlings can stand the winter. The first indication I had of this was with some trees that Professor Budd sent me. They had passed a hard winter, and only the more extended roots were living.

PRESIDENT WELLHOUSE: I want to say a word about long roots. In 1876 we planted out about 30,000 grafts and some 4000 or 5000 of whole roots. We had heard a great deal about these whole roots, so we planted about 5000. We ran a dead furrow and put the lister in and made the furrow just as deep as we could get it, and when we planted the whole roots we had to take a spade and dig down still further. We took them all up at two years old, and planted about 30,000 which were from piece roots of the usual length—two inches. We planted our orchard in Miami county. In the orchard there were two rows of Missouri Pippins and two rows of Ben Davis on whole roots planted in the spring of 1878, and growing there now. If any man can tell the difference, he can do more than I

can. The only difference I saw in that time was that the whole roots sent up more seedling sprouts and caused us lots of work, but so far as the longevity of the trees was concerned we could see no difference. But they were terrible things to sprout. About nine-tenths of our two-inch roots, when we took them up from the nursery, had sent out roots from the scion, and the more we experimented in that line the more we desired them that way; and from that time on we have used only short roots, to get the roots from the scion, and have always been satisfied with them. Whenever you pay one mill more for a whole root than a piece root you are just out that much more money.

A. MEMBER: Was there ever a man that could himself tell a whole root from a piece root?

PRESIDENT WELLHOUSE: I do not think any man could tell. I do not think one nurseryman in a hundred grows whole roots. It took us exceedingly long to plant those 4000 or 5000 whole-root grafts. I regard it as a very foolish idea. Of course, if a nurseryman is getting four or five prices for such trees, I cannot wonder at his advocating it. I do n't know but I would do so myself. We examined the trees that had the short piece of root and found the roots above the graft hardy and vigorous. It reminded me of a potato. After the potato vine is well started the old piece of potato is there, seemingly alive, yet it is of no apparent use after the potato has sprouted. It is the same with the old apple roots. I have examined them after five years and found the two-inch piece of root in the same condition as when planted, while the new roots all came out from the scion and made them healthy trees on their own roots. We have practiced and watched this matter for about twenty-five years. The whole-root business is one of the biggest humbugs ever perpetrated on credulous people.

SELF-STERILE FRUITS.

By PROF. A. S. HITCHCOCK, Manhattan.

My subject is self-sterility in orchard and small fruits. Growers for a long time have known that certain varieties when planted alone, or certain trees when isolated, refused to bear; yet only recently the reason for this has been established. This subject is not new to this Society, nevertheless a brief review of it may be of interest.

To understand the principle involved it is necessary to call to mind the structure of a typical flower; for example, that of the peach. Four series of organs compose the flower; the calyx, on the outside, for protection; the corolla, in this case of five showy petals, for the purpose of attracting insects; the stamens, which furnish pollen; and in the center the pistil, which contains in the lower part the two ovules, only one of which matures. At the top of the pistil is the stigma, a sticky surface for the reception of the pollen. The production of seed, and in most plants, also, the production of fruit, depends upon the fertilization of the ovules, accomplished as follows: The pollen, consisting of minute grains, is transferred from the anthers, on top part of the stamens, to the stigma. This transfer may be brought about by the agency of the wind, as in corn, willow, cottonwood, and pine; or be carried unconsciously by insects which visit the flower for nectar; or it may fall directly upon the stigma of the same flower, as in some self-fertile flowers, of which wheat would be an example.

We are at present interested chiefly in the second category, to which our peach flower belongs. Flowers secrete nectar solely for the purpose of inducing insects to visit them, but the parts are so arranged that the insects in obtaining the nectar brush some part of their bodies against the anthers, then on entering another

flower the same part is brought in contact with the stigma. Soon after deposition the pollen grains germinate by sending down a tube, which penetrates between the cells of the stigma and style on down into the ovary, where the end of the tube comes in contact with and crowds its way into the opening in the end of the ovule, until it reaches the egg cell, situated just below this opening; then a portion of the contents of the pollen tube passes into the egg cell and it is said to be fertilized. Fertilization stimulates this egg cell to renewed growth and within it is developed the embryo, a small plant. After awhile the growth is suspended and we have the seed. One pollen grain will fertilize one, and only one, ovule; hence there must be as many pollen grains as there are ovules. Usually there are many more grains deposited and pollen tubes formed than are necessary, in order to guard against accident and to insure fertilization by the most vigorous pollen.

It has been proven experimentally, first by Charles Darwin and later by others, that most species of plants produce a more vigorous growth when cross-fertilized than when self-fertilized. It is better that the ovules should be fertilized by pollen coming from a separate individual. There are many devices by which flowers accomplish this beneficial result. A study of these and of the relations between flowers and insects forms an important branch of botanical science. Suffice it here to say that there are many structures or conditions present in different flowers which aid in their cross-fertilization and hinder self-fertilization. The condition with which we are chiefly interested in this discussion is what is known as prepotency of foreign pollen. This is a term to express the rather general fact that pollen from a different individual, when placed on the stigma of a flower at the same time as its own pollen, will grow faster and fertilize the ovule. The average result is that flowers are more likely to be fertilized by foreign pollen, but if this is not presented they will take their own pollen.

In some species of plants, how many we do not at present know, this preference for foreign pollen is carried to an extreme and the plant will not accept its own pollen. Such plants cannot be fertilized unless they receive pollen from a separate individual. They are known as self-sterile plants, and the condition is known as self-sterility.

But what is foreign pollen, and what is a different individual?

So far as its bearing on this question is concerned, it seems that an individual, to be different, must have originated from a different seed. Hence, from this same standpoint, all varieties of cultivated plants which are propagated vegetatively—that is, by grafts, buds, cuttings, etc.—are merely an individual cut up into many parts. Therefore, if the individual was self-sterile in the first place, all its bud offspring will share in this character, just as they have in other characters which mark the variety. From a horticultural standpoint self-sterility is of vast importance. You are familiar with the history of the discovery of self-sterility in the Bartlett pear and its bearing upon the pear industry in New York. Since then self-sterility has been found present in several varieties of orchard fruits, and also some varieties of grapes. Like other characters of the horticultural family, this condition varies. Some varieties are absolutely self-sterile, or so near that only occasionally will a fruit result from self-pollination, while others are only partially so; or they may be self-fertile, but the result is much inferior in quality to that produced by cross-fertilization. Again, the same variety, in different localities or under different conditions, may be more or less self-sterile.

From a practical standpoint, it is always safest to take the benefit of the doubt, and, if a variety has proven under any condition to be self-sterile, to as

sume this for all conditions. It is safe to assume that, under all conditions, the fruit will be better because of cross-fertilization.

In planting there should be a mixture of such varieties as bloom about the same time. It is an advantage if honey-bees are quartered in the vicinity, as the trees must depend on insects to bring the foreign pollen. Many wild insects aid more or less in this, but the honey-bee is the most efficacious.

Whether a variety is self-sterile can only be determined by experiments. A careful manipulator, with time and patience, can determine this fact for himself. Before the anthers shed their pollen the stamens should be cut out and the flower enclosed in a sack. Fine netting is a sufficient protection. This is to prevent insects from visiting the flower. With a number of flowers treated in this way, half of them pollinated with their own pollen and half with pollen from a different variety, keeping them covered until the fruit is set, the relative benefit of the crossing can be observed. To transfer the pollen, a clean stick or the anther held with a pair of small forceps is good. Great care must be observed that only such pollen reaches the stigma as is wanted. For the benefit of those who have not Professor Bailey's work, I append a list of fruits whose relative fertility had been determined at that time.

PEARS (White): Varieties more or less self-fertile are Anjou, Bartlett, Boussock, Clairgeau, Clapp, Columbia, De la Chene, Doyenne Sieulle, Easter, Gansel's Bergamotte, Gray Doyenne, Howell, Jones, Lawrence, Louise Bonne, Mount Vernon, Pound, Sheldon, Souvenir du Congess, Superfin, Colonel Wilder, Winter Nelis. Varieties generally self-sterile are Angouleme, Bosc, Brockworth, Buffum, Diel, Doyenne d'Alencon, Flemish Beauty, Hearthcote, Kieffer, Le Conte, Manning's Elizabeth, Seckel, Tyson, and White Doyenne.

APPLES (Waite and Fairchild): Varieties more or less self-sterile are Bellefleur, Chenango (strawberry), Gravenstein, King, Northern Spy, Norton Melon, Primate, Rambo, Red Astrachan, Roxbury Russet, Spitzenburg, Talman Sweet. Varieties mostly self-sterile are Baldwin, Codlin, Greening.

The varieties of apples are more inclined to be sterile to their own pollen than the pears. With the former, in the great majority of cases, no fruit resulted from self-pollination. The results as a rule, however, were less clear cut than in the pear, because with most of the self-sterile varieties an occasional fruit will set under self-pollination, and none of the varieties were very completely self-sterile.

OTHER FRUITS: Many native plums are notoriously self-sterile, particularly Wild Goose. (Wild Goose is well pollinated by Moreman, Newman, Smiley, and Miner, according to J. W. Kerr.) Other self-sterile varieties are Miner, Wazata, Minnetonka, Itasca. Varieties more or less self-fertile are Moreman, Newman, Wayland, Golden Beauty, Marianna, Deep Creek, Purple Yosemite.

Strawberries often lack stamens altogether, while others, like Crescent, have so few and so poor stamens that they are practically self-sterile. Ordinarily there should be a row of a perfect-flowered variety for every two rows of a pistillate or infertile variety.

The quince seems to fruit nearly as well with its own pollen as with that of another variety.

GRAPES (Beach): Unfruitful when planted by themselves are the Black Eagle, Brighton, Eumelan, Massasoit, Wilder, Roger's No. 5, Gaertner, Merrimac, Requa, Aminia, Essex, Barry, Herbert, and Salem. Able to set fruit of themselves are Concord, Diamond, Niagara, Winchell or Green Mountain, Roger's Nos. 13, 24, and 32, Agawam, and Delaware.

VEGETABLE GARDENING.

By F. L. KENOYER, Independence.

Poisoning Cutworms.—The cutworm is one of the worst enemies with which the gardener has to contend, yet it is one of the easiest of insects to destroy. The damage they do annually to newly set vegetables and strawberry plants is immense. Last spring I noticed many strawberry plants on one tract of my farm apparently dying. A careful examination revealed the fact that cutworms, sometimes as many as four to a plant, were eating out the crown buds. I found the worms were also raiding a tomato and cabbage patch near by. I took a gallon of wheat bran, moistened with water, and stirred into it a heaping tablespoonful of London purple. This mixture I sowed broadcast over the infested fields. The next day I walked over said fields and saw many dead bodies of the enemy, but not a living one left to tell the tale of woe. Cutworms are exceedingly fond of bran, and will leave any plant to feed on it. If gardeners and berry growers would scatter poisoned bran over their ground the day before setting their plants, many would be saved from destruction, and the time required to reset missing plants also be saved at a busy season.

Catch-crop for Melon Aphis.—Heretofore I have had to spray my cucumbers and cantaloupes every season with a decoction of tobacco to destroy melon aphis. The past season, by chance, I discovered a remedy that worked so effectually as to render the spray pump unnecessary. Early in spring I prepared my melon ground, and before the season for planting arrived I drilled turnip and radish seed between the rows left for melons. The turnips and radishes were large enough for use by the time the season was sufficiently advanced to plant the melon seed. These vegetables were covered with turnip aphis, and ladybugs and lacewing flies were after them by hundreds, and were depositing eggs by thousands. The inferior and unsalable turnips and radishes were left to occupy the ground and hold the insects until the melon plants had attained sufficient size to be attacked by the aphids. I then cut the tops off the turnips and radishes and left them scattered over the field. As the plants wilted the lice perished, and the ladybugs and lacewings had to go elsewhere in quest of food. These soon spread over the melon patch, and in a short time every melon aphis was devoured, although they were more numerous than usual. This method of combating plant-lice not only dispensed with the use of the spray pump but enabled me to secure two crops from the same ground. Further experimenting will prove whether it will work equally well other seasons. If in any one season it should fail on account of the absence of turnip lice, the crop of vegetables would amply pay for the extra labor expended. All who grow cucumbers or melons for market should try this experiment.

KEEPING POTATOES THROUGH SUMMER.—The potato is the most valuable of garden vegetables. So important is it as an article of food that no bill of fare is complete, no table well furnished, without it. It is used alike by the rich and the poor, the healthy and the invalid. No other vegetable but the potato is eaten three times a day, and 365 days in each year. As valuable as is this product of the soil, and as easily as it is grown, it is a fact that three-fourths of the farmers of our state do not raise one-half of the potatoes their families consume. Thousands of dollars are spent annually to purchase potatoes brought in car-loads from other states, when they could be easily produced at home, but for the simple reasons that old potatoes can scarcely be kept through the hot, dry-weather months, and early potatoes, dug as soon as matured, will not keep unless placed in cold storage. Left in the ground, they are in danger of being scalded

by the hot sunshine or made to grow by the summer showers. They are usually carried through by allowing a heavy growth of weeds to cover the patch, for the purpose of shading the tubers from the sunshine and taking up the moisture after each rain. This method, though generally successful, is at best a poor makeshift, as it leaves the ground heavily seeded to weeds, and the rank growth of weeds makes it a laborious task to dig the potatoes.

Sometimes during a severe drought the weeds lose their vitality and a subsequent shower ruins the potatoes. Last summer, before cultivating my potatoes the last time, I sowed cane seed through the patch and laid them by with a twelve-tooth cultivator, which covered the seed the proper depth. By the time the potatoes were ripe and the tops dead the field was green with growing cane. This made a rank growth, protecting the tubers from the summer heat and absorbing the moisture after each rainfall. The cane remained green the entire summer. Late in autumn I cut it for winter feed. This left the ground bare and easy to harvest the potato crop. I secured five tons per acre of sorghum hay, worth four dollars per ton. The cane proved to be a better protection to the potato crop than weeds, besides adding an extra twenty dollars cash value to each acre. There is no reason why an extra fifteen or twenty dollars' worth of forage may not be realized annually from each of the thousands of acres of potatoes grown in the famous Kaw valley, and elsewhere.

DISCUSSION.

EDWIN TAYLOR: This suggestion of Mr. Kenoyer's is valuable. Others have tried it and been successful. There is only one question, and that is whether the ground will not be exhausted by two crops.

F. L. KENOYER: I have ground on which I have grown cane twice a year for ten years, and the crop was just as good this year as any.

J. W. ROBISON: I can go Mr. Kenoyer five years better. I have a cane field that has had fifteen crops in succession. I have failed to raise anything following cane but cane. I have sown oats, and, where they lapped onto cane ground, they were not worth harvesting. It is the same with winter wheat. I think no farmer would think of raising corn following cane.

D. C. BURSON: I tested it a little this summer in the Kaw bottom. After digging potatoes I sowed cane and grew a splendid crop, and it was of benefit to the ground, for if you do not sow some crop the weeds take possession. Cane does not take any more strength from the soil than weeds do, and I would advise growers in the Kaw valley to dig their potatoes early and at once sow cane, and they may get two or three tons to the acre; and sometimes it will pay better than the potatoes, if you are close to market. Cane is selling here (Topeka) now (December) for from four to five dollars per ton, and it keeps the ground in better condition than to let it lie idle.

F. J. RUDE: Four years ago I had some costly experience in raising cane. I had three acres of potatoes, and followed them with cane. The following year I planted peas, but where they were on the cane ground they were a failure.

J. L. WILLIAMS: Not all of us are growing potatoes by the thousands of bushels. A good many grow potatoes only for home use and not for the general public. Last summer I grew about thirty bushels of Early Ohio potatoes. In August, when it was very hot, I dug them, put them into small boxes, and placed them immediately—one on top of the other—in the coal-house. There was enough heat and dryness to take off the surplus moisture. After they had been in the coal-house a month I took them to my cellar, and had enough potatoes to last me all winter, and they are good—not such potatoes as the people bring to market from the Kaw valley. I consider the potato usually put on the

market as not fit to eat; they are left till overripe and are spoiled. We are sending for northern potatoes, when, if those we raise at home were properly cared for, that would be unnecessary to any large extent, when compared with the quantities shipped in at present. I would like to inquire whether any one here has tried to raise a second crop of potatoes for seed.

EDWIN TAYLOR: The gentleman introduces what to potato people is important. In the South second-crop seed is what is depended upon altogether. We tried to make new potatoes grow, and except at intervals we could not make them sprout. One reason is that we use almost altogether the Early Ohio. It is one of the hardest potatoes to sprout there is. In the South they use the Triumph and Early Rose, and they tell me that they have no trouble to make them sprout for the second crop. We put potatoes in cold storage [for late planting], but that is not satisfactory. I planted potatoes from cold storage last year, and when it was as hot as it could be they began to blight; but second-crop potatoes, when you do get them, are worth two to one more than the others. They seem to come up a little earlier, if the stock is good. I saw something in regard to this in an agricultural paper several years ago, and it struck me as a valuable point in potato raising in Kansas. My first experiment was accidental. I was surprised to see how well they kept, and what vigorous tops they produced. They were ahead of anything, and on those new potatoes there was not a sign of a spot. I make it a rule to grow some every year for the next year's planting. I now irrigate to produce the second crop for seed.

JOHN FULCOMER: I would like to ask if the same result could not be obtained from potatoes carried over in cold storage?

EDWIN TAYLOR: Most of the people who try to raise a second crop do not plant cold-store potatoes. They should not be planted at the time the early potatoes are dug. The 20th of July is plenty early to put them in. Otherwise they will ripen up in early September. They want to be so grown that they will develop in the cold part of the fall, before frost.

A MEMBER: Do you dry the potatoes?

MAJ. F. HOLSINGER: In regard to the temperature, I would say that last year we had a few in our garden, and I found that the volunteer potatoes were a better crop than the first planting. Early Rose alongside them made no crop at all.

F. L. KENOYER: I would like to ask whether any of you have tried planting potatoes from the extreme north. I got some from Manitoba and they grew exactly like the second crop of home-grown potatoes.

EDWIN TAYLOR: The common seed planted in the Kaw valley is from North Dakota.

VEGETABLE GARDENING.

By G. F. ESPENLAUB, Rosedale.

The aspect should be a south or southeastern one, not steep enough to wash. The soil should be a sandy loam; it may be moderately moist, but not wet; for wet means cold, and soil will not warm up until dry enough. When one is near enough to market and on good roads manure hauling should be considered the chief corner-stone for successful gardening; as much manure as is possible to get on the ground and plowed under before freezing up should be the constant aim of the gardener; it will decay and absorb moisture during winter and early spring, and is less liable to fire the ground during the following season than spring manuring; ground can also be worked earlier for it. Such ground need not be plowed in the spring; a good harrowing and planking will fit it splendidly for seeding.

Seeds sown first in the spring are also those that germinate slowly, such as radish, lettuce, beet, spinach, carrot, parsnip, celery, asparagus, pea, and salsify. The tenderer sorts, such as beans, tomatoes, and eggplants, must be deferred until frost is over. The early planting of potatoes can be taken off in time for sugar corn; early peas can be succeeded by late tomatoes and sweet potatoes. The first crop of Adam's corn can be planted with Stowell's Evergreen between the rows before it is all harvested, and will have plenty of time to mature roasting-ears. Early sown spinach on very rich soil—as it should be—makes a fine bed for celery, which need not be planted before the 4th or 15th of July, as this crop makes its best growth in autumn, when the nights are cool. Hubbard squash can be planted among early potatoes, every sixth row; when the squashes begin to run the potatoes must come off. Early potatoes can also be followed with sorghum or Kafir for fodder, or turnips. In following this line of succession the second crop often pays better than the first. Ground should never be idle, and by no means should it be allowed to grow up to weeds—better by far sow it to oats and plow them under before winter.

VEGETABLE GARDENING.

By F. J. RUDE, Shawnee county.

The year 1900 was one of diversified weather with us, inclining to be drier than was good for most crops, while a few miles east they had an abundance of rain.

The year opened up favorably for garden work. January was warmer and brighter than usual. Plants in the hotbeds made a fine growth. February, while it was much colder than January, was a nice month for hotbed work. The winter until the last of February had been very dry. On the last day of the month we had a very heavy snow, that supplied the much-needed moisture. March opened very cold, and the soil was very wet and not fit to work until the 13th, and it was most too wet to work at this time. A mistake was made here by a great many gardeners in planting small seeds so shallow that they could not germinate for lack of moisture, and it took a long time for them to start. April opened very dry, with nice weather for all kinds of work, but too dry for plant setting, until the night of the 15th there was a fine rain, which was so much needed for early plant setting. The latter part of April and first half of May were very seasonable, and all kinds of garden crops made a fine growth. The last part of May and fore part of June were very dry, and all crops that were not kept well cultivated and free from weeds suffered for want of moisture.

During the last of June and the first part of July there were fine rains and everything bid fair to make a very heavy crop, until the last of July, and August was so dry that all crops suffered from the excessive heat and want of moisture. Crops that had been kept well cultivated withstood drought, and when the rain came, the 1st of September, put forth new life and made a fair crop. In looking back over last year's crop and weather we can see that drought should be prepared for before it comes. From last year's experience, I would say plow in the fall. Land plowed in the fall will stand more dry weather, and can be worked easier in the spring, and is in better condition to produce a crop than land plowed in the spring.

In January is the time that tools should be looked after, and see that they are sharp and in good condition to use when the time comes for their use. In this latitude hotbeds should be made for early cabbage and lettuce the last of January. At this time pie-plant can be started, either in the greenhouse under the benches

or outside under glass. Pie-plant for field culture will produce a heavier crop if it is mulched with coarse manure, which keeps the soil moist. In February, sow the tomato, eggplant and pepper seed for first early plants, in well-prepared hotbeds; also sow more cabbage seed, of the large summer variety. The first of March the old asparagus tops should be cut and burned. If the tops are left on until this time they hold the snow and it supplies the moisture that asparagus so much needs.

As soon as the soil can be worked in the spring such crops as are hardy should be planted, and keep planting for succession every few days. At this time the hotbeds should be well looked after and properly aired and plants hardened, so they will be fit to set when the proper time comes. As it grows warmer in the spring plant such crops as are not so hardy, and keep planting every few days, for sometimes a late frost will kill the first early vegetables. In May and June the cultivator should be kept at work and all crops should be free from weeds when laid by.

Some of you may ask what crops yield the most profit. That is a difficult question to answer, not knowing your soil or location. Find out what your market demands and what you can raise at the most profit and what kind of crops your soil will produce most profitably. Use up-to-date tools, in the proper manner.

THE CULTURE OF HARDY FLOWERING BULBS IN EASTERN KANSAS.

By Dr. S. W. WILLISTON, Lawrence.

Home adornment—the cultivation of the beautiful—is as much a part of civilized life as incessant pursuit of the practical and the economical. What I will have to say, will, perhaps, more particularly interest the home makers—our wives and mothers; but I wish that I might also interest the home provider and supporter in a larger degree than is usually the case. To the worried man of affairs, healthy recreation lengthens and sweetens life. Forgetfulness of its cares, even for a few brief hours, gives rest and strength. Let the husband and father show an appreciative interest in the beautifying of the home and home surroundings, even though the home be humble, and the mother, sons and daughters will be the gainers throughout life.

So much has been written upon the subject of flowering bulbs that anything now written may seem superfluous. But every climate and every region has its own exigencies of heat, light, and moisture, that make all the difference between success and failure. We learn these conditions by experience, as the fruit raiser learns what is best for his own particular region; but often experience is discouraging, and the busy person may not always have the time or inclination to learn in this way. What, then, I have to offer is merely some practical advice for the cultivation of these beautiful plants in our own homes—advice that comes from years of failure and success. Even the most humble home, where every dollar must be scrutinized carefully before it is spent, can have many beautiful flowers, if there is love for the work; and if there is no love for such things, it were better not to try them.

One of the most common mistakes of amateurs is to try too many things at once; a dozen or two bulbs of different kinds and all of unfamiliar aspect are attempted; the result is usually unsatisfactory, and failure is more or less imminent. Better get a goodly number of one or at the most two kinds for the first year, and each year add something else. The best and most satisfactory bulbs are not at all expensive, if one is willing to begin with the old and established

varieties of merit. Let novelties alone until you know all that there is to be learned and all there is to be enjoyed from the old friends.

Of all flowering bulbs, the first place must be unquestionably given to that royal flower, the tulip. He who can see a bed of tulips in full bloom and not be pleased with them is surely wanting in an appreciation of the beautiful. Prepare the bed as for all other bulbs, save perhaps the narcissus, by spading deeply in an open, sunny place, where shade never comes in the summer. A light, porous soil is best; it must not be stiff and clayey. Most essential of all, in fact, the absolute necessity, before which all other conditions are insignificant, is perfect drainage. This condition of drainage is not so essential during the period of growth, when the bulbs will submit to considerable moisture, as it is during the period of rest in summer time. It is for this reason that the beds should be fully exposed to the summer sun, and should receive no artificial watering, unless exceedingly dry, when a little will do no especial harm.

Plant the bulbs as early as possible in the autumn, certainly before the end of October, about four inches deep, that is, four inches from the top of the bulb. If one does not mulch in winter, I should plant even deeper than this. I have had tulips planted in light soil six inches deep that have blossoms in perfection each year, with no care whatever. The bulbs should be planted about four inches apart each way. Raise the surface of the bed so that no water will stand upon it. The common practice is to mulch the beds with a covering of old manure or straw during winter. This I do not specially recommend, except where the bulbs have been planted very late in the season. The bulbs are very hardy, and freezing does not kill them. Alternate thawing and freezing does, however, weaken their vitality. I have had bulbs lying upon the surface of the ground all winter strike root in the spring and produce flowers, though poor ones. The use, then, of mulching, is simply to keep the *cold* in, not the warmth, and anything that will shade the ground from the winter sun is all that is sufficient. If planted deeply, however, in a light, well-drained soil, one may have good success, with no attention whatever to the beds after once planting.

The bulbs begin to make their appearance through the ground early in March, and it is no harm to remove any covering at this time, in order to check their too rapid growth. The early varieties begin blossoming the first week in April; the later ones continue beyond the middle of May. If the beds are to be used during the summer, as they should be to prevent their unsightly appearance, plant such flowers as do not root deeply and do not require much watering. I know of nothing better for this purpose than the old-fashioned, though beautiful, portulacca. This plant will grow a natural mulch for the winter and will seed itself in the spring, the only care necessary being to thin out the too numerous plants.

Do not remove the bulbs unless absolutely necessary; they are protected better in the soil when not too wet during the summer. If it is necessary to remove them, do not do so before June 10, in this latitude, unless you are going to throw them away. At the end of the third season the plants will have increased to such an extent as to interfere with their best growth. Remove them in June, allow them to dry thoroughly in the shade for a week or two, put them in loose cloth bags or thin paper, and store them in a cool, dark and dry place—a clothes closet is usually good—until the middle of September, when they should be again planted.

It is my custom to plant these bulbs, large and small, interspersed together, though one may, if he choose, separate the blooming from the small bulbs and plant separately. In purchased bulbs, from Holland, one will get the best suc-

cess the second season. The annual increase under good treatment is from fifty to seventy-five per cent. of blooming bulbs, and the best and largest tulip bulbs that I have ever seen have been those grown in Kansas.

If one can afford it, it is the nicest to buy the selected varieties, keeping them separate and planting them in proper contrast of color and time of blossoming. But one will do nearly as well if he buys the mixed single and double. They cost only about \$1.25 a hundred, and a hundred of each will make an excellent beginning. To these I should add about fifty of the late and tall Bybloemens or Gesnerianas. I do not recommend the earliest varieties; our seasons are too variable at the beginning of spring to produce the best results with these. Their buds are often blasted.

Precisely the same treatment as for tulips is recommended for hyacinths, except that they should be planted a little deeper and five or six inches apart. Contrary to what is generally supposed to be the case, hyacinths, if grown in a proper, well-drained soil will not deteriorate much, if any. Still their success after the first year is not certain, as with tulips, and, because their first cost is so very much greater, one may begin with a dozen bulbs and add to them as he has success.

Next to the tulips there is no bulb that will give greater success than the narcissus. Fortunately these bulbs are not so particular about the soil and drainage. They never lose their roots in summer, as do the tulips and hyacinths, and a wet soil has no terrors for them. Still they will repay giving a rich soil. They multiply with extraordinary rapidity. Three years ago I planted two dozen mixed bulbs of narcissus. The past summer I transplanted from them over 100 blooming bulbs. They should be grown in grass for good effect and will thrive when naturalized among the grass, provided they are not set in the lawn before July 1. They should not be disturbed after planting until they become too crowded.

The old-fashioned daffodil, with its large double flowers, is one of the most conspicuous, and thrives wonderfully well. Unfortunately, with me, they tend to deteriorate in their flowers, becoming greenish. All kinds are, however, desirable, though the most gorgeous of all is the *Hotsfeildii* type, which does well. The jonquils, like the true narcissus, will stand neglect and bloom satisfactorily, asking that they be transplanted every three or four years. Narcissuses are as cheap as tulips, and one should begin with not less than fifty bulbs.

Next in importance to the foregoing is the crocus. Its needs are more imperative in some respects than any of the foregoing. The soil for their growing must be light and loose. They will thrive best in shady soil. In clayey soil they die out in a year or two. I have had good success with them planted about shrubbery, where numerous rootlets keep the soil light and free from excessive moisture. The yellow variety seems to thrive best of all.

To treat fully all of the various kinds of hardy bulbs that I have found well adapted to culture in Kansas would lengthen this paper unduly, but I cannot forbear mentioning three or four others—bulbs that with half a chance will become wildlings, so ready are they to do for themselves. The little grape hyacinth, *Muscari*, when planted thickly among shrubbery—the soil here suits them well—will in a few years carpet the ground with small, pretty blue flowers. Next to these is the little *Chionodoxia*, which multiplies rapidly from seed until they have become scattered widely in my garden. *Ornithogalum umbellatum*, with its pretty flower, coming a little later than the others, has, in not a few places, escaped from the garden. From a little bulb, carelessly planted by children in the grass five years ago, there are now hundreds of the

plants growing wherever they can get a chance. They increase so rapidly that they need resetting every second or third year to do well. They are indifferent about their soil. Another, but rarer, bulb I have found very satisfactory in its hardiness and pretty blue flowers is known as *Puschkinia*, resembling the *Chionodoxia* (the old crown imperial, familiar to many of you), should not be overlooked, though not vying in beauty with the ones already mentioned; it should be planted eight or ten inches deep. *Tritileia*, when planted among shrubbery, has been very satisfactory with me.

The culture of lilies is a trade all by itself, for their demands are exceedingly exacting, but when these demands are met there are at least five kinds that will grow in this latitude satisfactorily: the old tiger lilies (single and double), the *candidum*, the *longiflorum*, and Japanese *lancifolium*. It is hardly worth while to attempt any others in the garden, unless one is prepared for failure.

For all the foregoing, with the exception of the narcissus, I will again impress the necessity of the three essentials to success: Deep planting, loose soil, good drainage. If these three are provided you are sure to succeed; without them you are almost sure to fail.

CARNATIONS.

By CHAS. HUMFELD, Clay Center.

This is a grand flower, known the world over, in endless varieties. Of late years there have sprung up some of the most beautiful varieties ever produced. I call attention especially to the grand variety called Lawson, of a pink color. A few years ago Mr. George Lawson purchased the entire stock from the originator at the large sum of \$30,000; so it well deserves its name. It is the largest and finest pink carnation that ever came under my observation. There are many other good varieties. In the white variety, such as Flora Hill, which is a grand bloomer, one of the finest blooming whites that I ever tried. I have a good many of the latest varieties on trial which are very promising. Take the old-stand-by pink carnation, William Scott; no pink carnation has kept pace with this as a free bloomer; it is nearly always in bloom.

In growing carnations for winter blooming, cuttings should be taken from January until March; after they are well rooted pot them off in two-inch pots, and about the last of April set them in the open ground in any ordinary garden soil, ten inches apart, in the rows a foot apart. They will soon throw out young shoots, which should be pinched back until the latter part of July or the fore part of September; then take them up and plant in four- or five-inch pots; firm the earth well, giving them not too rich a soil; keep them shaded for a week or ten days, then gradually bring them to the sunlight, and you will be surprised to see what an amount of bloom they will have. Give them plenty of water and ventilation. The night temperature should be fifty to fifty-four degrees, and day temperature sixty to sixty-five degrees. Keep all defective leaves picked off. Follow the above directions and you will have no trouble, and, will find that they will give you more satisfaction than any plant you may have in your home during the winter months.

VERBENAS.

By CHAS. HUMFELD, Clay Center.

Verbenas being my main specialty (I grow over 300,000 annually, of the choicest varieties), I will give in brief their culture. If there is any one flower above another that should have a place in your lawn it should be this grand flower. They should be planted out early in the spring, say about the 20th of April, if the

weather is favorable. They will stand a heavy frost without being injured. Plant them in any good garden soil, one foot apart, give plenty of water, and they will soon begin to grow and blossom and spread all over your flower-bed. Bloom after bloom will come forth, and you may never behold a more beautiful sight than their glowing colors. They are easily grown and stand hot and dry weather well. They bloom all the time. If you want them to bloom in the home in the winter, let the temperature be from fifty-six degrees at night to sixty or sixty-five during the day. Give them plenty of ventilation and water. If the green fly attacks them, put tobacco stems over the surface of the earth.

SOME PLANT-BUGS.

By F. L. KENOYER, Independence.

During June inquiries were made concerning a greenish-yellow or grayish plant-bug (*Euschistus variolarius*) reported as being in considerable numbers upon grape leaves. This pest is not of any importance, rarely doing any appreciable injury to cultivated plants, though rather common. It has been recorded by some writer as puncturing the skin of ripening tomatoes, peaches, and red raspberries, causing the juice of the fruit to flow. Lintner reports this insect as feeding upon plants and animals interchangeably. In connection with its presence upon the grape this year in such large numbers, it is perhaps of interest to some to mention its appearance about the electric lights at Manhattan for several evenings during the latter part of last May in such numbers that specimens of it could have been gathered by the quart.

The Variegated Cutworm.—During early summer this destructive cutworm appeared in large numbers over a wide area of this state. One could not but wonder where they all came from. Their disappearance was as sudden as their appearance. This cutworm is very destructive, owing to its great voracity and the broad range of its food. It attacks nearly all field crops, and when such are not conveniently at hand it readily attacks weeds and grasses. It is recorded as feeding upon knob-grass, clover, timothy, alfalfa, corn, leaves of peaches, apples, strawberries, willows, eupatorium, tops of grape-vines, and plantain. This cutworm is about 1.6 inches long and of a dirty brown color. It is quite easily recognized by the presence of yellow spots on segments 2 to 11, inclusive, and a black patch on segment 11 on the dorsal or back, while along the sides are two black lines. The adult is a plain-looking moth of a brownish-gray color. There are two broods of the insect, the first appearing during April and May, and the second during June and July. Its ravages this year were entirely by the first brood of larvæ. No larvæ of the second brood were seen. The work of three dipterous parasites upon the cutworms of the first brood was so extraordinary that only a small percentage of them developed into adults. Nursery stock, young fruit-trees and garden vegetables can be successfully protected with an arsenical spray.

The Curtis Scale.—Near Bonner Springs I found a plum tree upon which there were numerous specimens of this scale. As the tree was an imported one, it is likely that the scale was introduced into this state upon it. In conversation with one of the New York state inspectors of nursery stock, I learned that it is not now customary to destroy stock infested with this species, except in cases of extreme infestation. As a rule, little attention is paid to it, for in very few instances do trees seem to suffer or the scale more than hold its own. Thus it resembles our common orchard scale (*Aspidiotus forbesi*), which, though very abundant in this state, apparently does very little damage, and, compared one year with another, makes little, if any, increase in numbers.

The Melon Plant-louse.—This pest was very troublesome the past summer. There were complaints of it from nearly every part of the state. The aphid or louse is, during certain seasons, very destructive to pumpkins, squashes, water-melons, cantaloupes, and cucumbers, and thrives on no less than twenty-six other species of plants, among which are some of our common weeds, such as purslane, shepherd's-purse, peppergrass, plantain, etc. The insect is usually to be found upon these weeds at any time during the year. In the springtime or early summer winged forms will often leave these plants for melon vines or other cucurbs in the vicinity. After starting a colony of a dozen or so upon the leaf where she first alights, the female passes to other leaves, to establish more colonies. Soon the offspring develops, and assists in increasing the number of insects upon the plant and in spreading the species to near-by vines. As the aphids feed upon the under side of the leaf and exhaust the plant juice, the leaf soon wrinkles or curls. It frequently happens that nearly every leaf will suffer.

This pest is a difficult one to combat satisfactorily. Experiments in this state made with carbon bisulphide, recommended by Professor Smith, of New Jersey, prove that there is too great danger of injuring the plants to warrant its use. It is a good practice to pull up a "lousy hill" as soon as one is detected and bury it. If this is done in time it may prevent further spread of the insect. It is very difficult, even with an underspray nozzle, to reach the under surface of the leaves of melon vines with a spraying mixture. Kerosene emulsion will reduce the number, though many will escape destruction from the reason given. One grower said he protected his ground vines by turning the small runners over, exposing the under surface to the spray.

Potato Mealy Bug.—On July 25, Mr. Dickens, of the state experiment station, brought me specimens of a mealy bug, *Dactylopius*, not unlike those frequently found in greenhouses, which he reported as being in considerable numbers upon the potato plants of Mr. A. A. Warner, of Alden. To obtain some idea of the injury this insect was doing to the potatoes, I corresponded with Mr. Warner, and, in reply, received information that "the infested potato plants in nearly every case were the less thrifty in the patch, and generally possessed small, shriveled tubers. On the 10th of July the insect was on the underground parts of the stems and upon the roots, in large numbers, as shown by the cottony clusters. On July 30 it was almost entirely upon the tubers."

This was the first record I have known of a serious attack of a *Dactylopius* upon potatoes growing in the field. It will be interesting and valuable to watch the future appearance of this insect and to learn its distribution. I have found many specimens of *Dactylopius* upon the horsetail, *Erigeron canadensis*, and upon bunch-grass, *Andropogon scoparius*. Quite unlikely these three lots of *Dactylopius* were of the same species. In the course of time I hope to be able to publish more in detail regarding these peculiar insects.

A Cabbage-worm Remedy.—In some areas of this country it is almost impossible to grow marketable cabbage because of the numerous cabbage-worms. The ordinary spray mixture of Paris green and water has proven ineffective, and abandoned in some localities, because so little of the poison is held well distributed on the leaves. There has now been recommended, by the New York Experiment Station, another mixture which, by reason of its sticky qualities, holds better to the cabbages. It is made as follows:

Pulverized resin.....	5 pounds.
Concentrated lye.....	1 pound.
Fish oil (any cheap animal fat excepting tallow).....	1 pint.
Water	5 gallons.

The oil, resin and one gallon of hot water should be heated in an iron kettle until the resin is softened, after which the solution of concentrated lye, or potash, should be added slowly, and four gallons of hot water, and allow the whole to boil until it will unite with cold water, making a clear, amber-colored liquid. When boiled enough, add sufficient water to make five gallons. To one gallon of this mixture, add sixteen gallons of water and three gallons of milk of lime, or whitewash, after which add one-quarter of a pound of Paris green or other arsenite. Resin-lime mixture should be prepared only as used, and should not be applied after the cabbage is two-thirds grown.

This mixture was found very effective for combating cabbage-worms. The only objection to it is that it clogs up the valves and plunger of the spraying-pump, which, by careless handling, may be severely strained. The pump can be easily cleaned after using by taking it to pieces and rubbing the parts with kerosene. If gummy, it causes serious trouble.

Owing to the low price of cabbage in Kansas, and the effectiveness of the ordinary Paris green solution, this does not seem to be needed. The mixture costs more than Paris green, and takes considerable more time and trouble to apply. It is doubtful whether the average Kansas grower could use the mixture profitably. This must be decided by the grower himself. Arsenate of lead, while hardly as effective, sticks well to the leaves, and in this respect is superior to Paris green. It is the best remedy now made for combating cabbage-worms.

SPRAYING.

By P. J. PARROTT, Geneva, N. Y.

In all old fruit-growing districts of this country spraying is recognized as necessary in the care of the orchard. Provision is made for it as for other indispensable work. The ingredients and the necessary machinery are secured in abundance and are held ready for use at the proper time. In the more extensive orchards, the foreman and the men under his charge seem fully aware that it is their duty, and to their own and their employers' interests, to be constantly watchful for plant disease and insect foes, especially regarding the San Jose scale, which with some is becoming a serious menace. Many foremen have become very proficient in the care of the orchards under their direction, especially in recognizing the common foes of the fruit and trees and in the application of fungicides and insecticides. It is indeed a great treat to see the results of such practice. One foreman with only the training and prospects of a laboring life has, by constant attention and careful reading of horticultural literature, furnished gratuitously by his employer, become unusually expert in detecting drawbacks in the orchard under his care. It was surprising how clever this man was in picking out one particular species of scale-insect from five others present on the estate. In several instances he found the San Jose scale where it had been overlooked by experts. Through his energy and management the orchard was freed from this pest.

Some orchards near Rochester which had failed to be profitable, when taken in charge by new owners and better care given them, turned out to be splendid investments. It is reported in one instance that an apple orchard, which for some time had been hardly paying expenses, under new management yielded the second year \$5000 net profit, which was regarded as a handsome return on the money invested. It seems almost incredible, but this result is attributed by the owners to spraying for the codling-moth, which had not been practiced by the old management. Doubtless the extra care of pruning and cultivation had much to do with this result.

Instances of this nature can probably be recalled from almost any locality. Some succeed where others fail; it often depends upon the man. In the state of New York the most successful horticulturists are the most enthusiastic in the support of spraying. Taking the state as a whole, spraying is much more generally practiced than in Kansas. To be sure there are those who disparage its use, but where spraying has been used the longest and is most widely practiced there we find its most hearty supporters. With spraying in Kansas we find contrary opinions. Some have succeeded, while others have failed; consequently some condemn, while others praise it. There are no doubt good reasons for these opposite opinions. Spraying is not always remunerative, nor is it always a failure; but I believe that, when done intelligently, it will be found in the majority of cases to be a profitable investment. In this state there are some people who denounce spraying for any insect pest just because they happen to think it is not really effective for the codling-moth. "Spraying," they say, "is a fake, a fraud, or all moonshine." The fact that it is so successful in controlling a dozen or more orchard insects other than the codling-moth seems to be overlooked by them.

It has been demonstrated again and again by experienced scientific men, and especially by the extensive experiments of Prof. E. A. Popenoe, that it pays to spray for the codling-moth. Until we can prove otherwise by data based on as accurate and extensive observations and experiments, ought we not to delay our opposition to spraying, lest we discourage others from using what now has been proven, and is regarded by a majority of successful horticulturists, as being a profitable practice, and one entirely necessary for the realization of the best possible income from our apple orchards. Do n't oppose spraying for the sake of being "agin" something.

In press bulletin No. 66 of the Kansas Experiment Station, Prof. E. A. Popenoe tells of his intention to repeat the test of spraying for the codling-moth. The writer does not believe that there was ever a more thorough series of tests planned or better carried out. The experiment has now run for one season, and will doubtless be carried on through another summer, to insure against mistakes. The writer hopes that all interested in horticulture will await with interest the published results of the test. It may be, as proven in southern New Mexico, where there are more broods of the codling-moth during the apple season, that spraying for this insect in this state will be found a failure. Perhaps like experiments will demonstrate unmistakably, as was done before, that it is successful. In the meantime let all fruit-growers continue to spray for the codling-moth, as for other injurious pests. Strive each year to become more proficient in recognizing insect foes, and in the application of insecticides, for it is only by a united effort on the part of all fruit-growers that the best results can be obtained in spraying for our insect enemies.

During the past few years new insecticides have been placed on the market. A number of them have been advertised quite extensively by their manufacturers as excellent substitutes for Paris green in that they are equally effective in destroying insects and cost much less in price. Before giving an opinion to the public of the merits of these new remedies, it has been very desirable to test them for insecticidal value and their effects on foliage, as compared with Paris green, which with most horticulturists is regarded as a standard insecticide. Of these new insecticides, green arsenoid (green arsenite, Sheele's green), pink arsenoid, arsenate of lead and paragne have been listed, and the results as given below will show that they are deserving of recommendation for practical use.

The green arsenoid is manufactured by the Adler Color and Chemical Works,

Brooklyn, N. Y., and, according to the latest price-list, costs 15½ cents per pound, when ordered in lots of 100 pounds. It is quite similar in composition to Paris green, and appears to be equally safe to foliage, when applied at the ordinary strength. Moreover, this insecticide is more flocculent than Paris green and remains much longer in suspension. In a test at the New York Experiment Station Paris green settled in five minutes, while green arsenoid was held in suspension for two hours. This last quality, together with its insecticidal value, should recommend it for practical use.

Trees sprayed with green arsenoid were more uniformly freed from canker-worms than those sprayed with Paris green. The second application practically freed the trees. In combating the potato-beetle, green arsenoid seemed as efficient as Paris green; in experiments with the codling-moth and the cabbage-worm it was equally satisfactory. Pink arsenoid is also manufactured by the Adler Color and Chemical Works, and sells for eight cents a pound when purchased in large quantities. As an insecticide it is nearly the equal of Paris green, and seems as safe to the foliage. Because of its cheapness it will undoubtedly be more extensively used; when employed against the potato-beetle, it was fully as satisfactory as the more expensive compounds. Arsenate of lead as an insecticide was first extensively tried by the Massachusetts Gypsy-moth Commission, where it was found to be the "most effective poison yet used." The findings of the commission are summarized as follows:

"Although nearly all poisons known to us which can be used as insecticides have been experimented with during the past five years, in the hope that something would be found which would prove fatal to the gypsy-moth, only one which is more effective than Paris green has been discovered. This is arsenate of lead, a poison slower in its action than the other, but which has three distinct advantages: (1) It can be used at any desired strength without serious injury to the foliage; (2) it is visible wherever used, as it forms a whitish coating on the leaves; (3) it has adhesive qualities, given it, probably, by the acetate of lead, and therefore remains on the leaves for a much longer period than Paris green; when sufficient glucose was added to a strong mixture of arsenate of lead, it withstood rain-storms and remained on the foliage during an entire season.

"The arsenate of lead is prepared in the proportion of eleven ounces of acetate of lead, four ounces of arsenate of soda, and 150 gallons of water. Place the acetate of lead in four quarts of water in a wooden pail and the arsenate of soda in two quarts of water in another wooden pail, and when entirely dissolved mix in a barrel containing the 150 gallons of water. When employed against the apple-tree tent-caterpillar and larvæ of the mourning-cloak butterfly the poison was very slow in its effects, but against the cabbage-worm it was much more effective. The Maine Experiment Station, in an experiment with insecticides for the potato-beetle, decided that it was the most effective of any of the insecticides used.

"This insecticide has the advantage over Paris green that when used in large quantities it will not injure the foliage of the peach, cherry, Japanese plum, or other tree of delicate nature. It is, however, expensive, and its effectiveness in destroying the common insects attacking our fruit and garden crops is not so well proven as that of Paris green. It should be given a thorough trial, especially on those fruits where Paris green is known to be injurious." (Bull. No. 6, Mass. Expr. Sta.)

Arsenate of lead is put up for sale by William H. Swift & Co. and the Bowker Chemical Company, both of Boston, Mass. It is sold by the latter company, under the name of "disparene," for twenty cents a pound. Arsenate of lead is now quoted at fourteen cents a pound. Doubtless, if purchased in large quantities, "disparene" could be obtained at about the same price.

Paragrene is a patented article, manufactured by Fred. L. Lavenburg, New York, and retails at 14½ cents per pound. In experiments with this insecticide against potato-beetle, the Maine Experiment Station found it as effective as Paris green, and in the amount used (one-half pound to the acre), it did not burn the

foliage so as to injure it at all. At this place it may be well to add that the arsenic and lime mixture, or arsenate of lime, as recommended by Professor Taft, of Michigan, is made by boiling one pound of white arsenic and two pounds of lime in two gallons of water for forty minutes, and diluting as required. In using this mixture there is considerable danger of an incomplete union between the lime and the arsenic. In several instances the foliage of apple trees was badly injured by using it.

The formula of Professor Kedzie is much to be preferred. It is made as follows: Boil two pounds of white arsenic with eight pounds of sal soda in two gallons of rain-water. Boil these materials together in any iron pot not used for other purposes for fifteen minutes, or until the arsenic dissolves, leaving only a small muddy sediment. Put the solution into a two-gallon jug and label: "Poison; stock material for spraying mixture." The spraying mixture can be prepared whenever required, in the quantity needed at the time, by slaking two pounds of lime and adding this to forty gallons of water; pour into this a pint of the stock arsenic solution; stir thoroughly, and it is ready for use. The arsenic in this mixture is equivalent to five ounces of Paris green.

The writer tried the Kedzie mixture for two years, and found it very effective in combating canker-worms, cabbage-worms, potato-beetle, and other leaf-eating insects. In some instances the leaves of the apple trees, following the second spraying, were slightly scorched. Though this mixture is much cheaper than Paris green, it does not seem to grow in favor with the horticulturists of this state. A good many prefer to pay a little more for Paris green or London purple, than to go to the trouble of preparing it.

If these new insecticides, as above mentioned, maintain their present standard, there seems to be no reason why they should not in the future be more extensively used. Nearly all of these have the insecticidal value of Paris green and possess an additional advantage of remaining longer in suspension. This last is a very important character, if an even application of the spraying mixture is desired. Paris green settles quickly, and unless the agitator of the spraying machinery is an unusually good one the larger portion of the Paris green is pumped out some time before the mixture is all used. If any of these new insecticides should in the future be in great demand, their adulteration by unscrupulous dealers and jobbers will doubtless be practiced, as is now being done with Paris green. The Gypsy-moth Commission of Massachusetts were greatly bothered by adulterated arsenite of soda, and finally had to send to England in order to obtain a pure article for use in making arsenate of lead.

All insecticides should comply in all particulars with the claims made for them in the patent office. And it is a good practice for those spraying extensively to submit samples of their purchases of insecticides to a chemist for analysis. In some of the Eastern states laws have been passed intended to prevent fraud in the sale of Paris green. Samples of Paris green are collected from the various localities and analyzed by experts appointed for that purpose. Later, in an official publication, the analyses of the Paris green, together with the manufacturers' names, are made known. Because of the danger in injuring their reputation as well as receiving severe penalties for violation of the law, no reliable firm is willing to run the risks of adulterating Paris green in those states. A law to prevent fraud in the sale of Paris green and other insecticides should be passed in every state. When purchased in bulk, Paris green, in the New York market, now sells for $12\frac{1}{2}$ cents per pound, while in St. Louis it is quoted at fifteen cents per pound. The prices for London purple are the same in both markets, excepting that when purchased in small lots it costs a little more than

Paris green, selling for seventeen cents per pound. At these prices Paris green is as cheap and in some instances actually cheaper than London purple. And both of them are less costly at present prices than some of the new insecticides. Were it not for the fact that Paris green settles more quickly than some of the newer compounds there would be little reason at the prevailing prices to change from Paris green, and especially so if the spraying-pump is furnished with a good agitator.

REPORT OF COMMITTEE ON EXHIBITS.

On the secretary's desk we find a collection of artificial fruit made by Miss Lizzie Rubart, of Junction City, Kan. These specimens are excellent copies in size and shape of the samples presented. The coloring is done by hand, with oil paints. The skill exhibited in the coloring is of the highest order. The committee recommends that county societies secure samples of the varieties grown in their locality and deposit with the permanent exhibit at the State Society's rooms.

The committee find on exhibition a fine collection of fruits of various kinds preserved in glass jars, in a liquid solution, which were prepared by the secretary. The committee recommends that fruit-growers in all parts of the state send choice samples for preservation. By this means the products of each locality will be shown, and the exhibit be appreciated by visitors. The committee consider the collection now on exhibition very fine, and commend the skill displayed in the exhibit as of high merit.

Of fresh fruits we find 560 plates, as follows: Exhibited by Major Holsinger, Rosedale, Kan.: Four plates Dominie, 1 plate Smith's Cider, 5 plates Willow Twig, 6 plates Clayton, 1 plate Ben Davis, 2 plates York Imperial, 2 plates Albemarle Pippin, 4 plates Father Abraham, 7 plates Rawle's Janet, 8 plates Gilpin, 7 plates White Winter Pearmain, 9 plates of seedlings. Committee recommended life membership, at the disposal of Mr. Holsinger. (Given to Geo. Holsinger.)

Grown by Geo. W. Bowman, Palisade, Colo., by irrigation: Three plates of Missouri Pippin, extra large and fine, 1 plate of extra-large Minkler.

William Cutter, Junction City, Kan.: Three plates Ben Davis, 2 plates Winesap, 2 plates McAfee, 3 plates Missouri Pippin, all fine specimens. The committee recommended a premium of \$3.

W. B. Eames, Delphos, Ottawa county, Kansas: Two plates Ben Davis, 3 plates Missouri Pippin, 1 plate Winesap. Committee recommended a premium of \$1.

A. Detlor, Grantville, Kan.: Three plates Missouri Pippin, 2 plates Winesap, 2 plates Jonathan, 3 plates Ben Davis, 3 plates White Winter Pearmain, 2 plates Lawver. Committee recommended a premium of \$2.

David G. Watt, Lawrence, Douglas county, Kansas: One plate Gano.

A. E. Dickinson, Meriden, Kan.: One jar apple preserves, flavored with ginger [root]. The committee commend it as worthy of trial. Also, one jar rhubarb, flavored with raspberry.

H. S. Bullard, Tonganoxie, Kan.: Twenty-eight plates Ben Davis, 18 plates Gano, 8 plates Missouri Pippin, 6 plates Jonathan. Committee recommended life membership. (Issued to H. S. Bullard.)

A. E. Dickinson, Meriden, Kan.: Thirty-nine plates Missouri Pippin, 23 plates Ben Davis. Committee recommended life membership. (Issued to A. E. Dickinson.)

Fred. Wellhouse & Son: One barrel Jonathan, to show type of facing.

From Southern Missouri: Two plates choice Ingram.

Canned cherries and strawberries, and two frames of alfalfa honey, exhibited by Mrs. J. J. Alexander, all appeared to be of excellent quality.

WILLIAM CUTTER,
W. G. GANO,
B. F. PANCOAST,
Committee on Exhibits.

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TRANSACTIONS

OF THE UNIV. OF MICH.

MAY 21 1908

KANSAS

STATE HORTICULTURAL SOCIETY,

(ORGANIZED IN 1869.)

CONTAINING THE

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